DRAFT

LTMP Literature Cited

Alam, S. K., L. A. Ager, T. M. Rosegger, and T. R. Lange. 1996. The effects of mechanical harvesting of floating plant tussock communities on water quality in Lake Istokpoga Florida. Lake and Reservoir Management 12:455-461.

Reference ID: 535

Keywords: Lake Istokpoga/Vegetation

Abstract: The effects of harvesting floating plant tussock communities by mechanical methods on selected water quality parameters in Lake Istokpoga, Florida were examined. Dissolved oxygen, temperature, pH, conductivity, turbidity, chlorophyll a, and nutrients (nitrogen and phosphorus) were compared under pre-harvest, harvest and post-harvest conditions. Water quality data were compared between one tussock harvest site and three reference sites (30 m, 61 m, and 91 m away from the harvested plot). Very minor, although statistically detectable ($p < 0.05$), DO differences occurred at harvest site. Chlorophyll a, total nitrogen and total phosphorus concentrations decreased significantly during the harvest. Loadings of total nitrogen concentrations in Lake Istokpoga could be reduced by harvesting of floating plant communities in the littoral areas. A significant increase in turbidity and dissolved solids occurred during mechanical harvesting in both the harvested plot and the reference site 30 m away.

Allen, L. H., E. H. Stewart, W. G. Knisel, and R. A. Slack. 1975. Seasonal variation in runoff and water quality from the Taylor Creek Watershed, Okeechobee County, Florida, USA. Soil and Crop Science Society of Florida Proceedings 35:18-20.

Reference ID: 65

Keywords: Kissimmee Basin/Okeechobee County/Taylor Creek/Rainfall/Water quality/Otter Creek/Williamson Ditch/Williamson Main/Brad Jones/KCOL

Notes: recorded by Brent Anderson **(unpublished report on file in reference center)**

Brief Description of Study

A water quality survey of groundwater and channel stream flow was conducted on Taylor Creek watershed. Concentration of nutrients were compared among sites, organized by their dominant agricultural land use, including intensive dairying containing improved pasture, improved beef cattle pasture, and irrigated citrus groves containing improved pastures.

Study Conclusions

Orthophosphate, Nitrate concentrations and stream levels were highest from the intensive dairying area. Chloride concentrations and stream levels were highest for citrus areas where saline artesian water is used for irrigation. Concentrations as well as stream loads of chemicals were highest during the high rainfall season, May through August, which indicates that nutrients were flushed from the watershed, rather than diluted. About 26% of the water, 48% of Cl, 29% of NO_3, 9% of OPO_4 in Upper Taylor Creek (36% of land), about 74% of runoff, 52% of Cl, 71% of NO_3 and 91% of OPO_4 from W-2A (64% of land) were 12, 10, 25 and 45% respectively. On a unit land area basis, W-5 contributed little OPO_4 and W-13 contributed heavily to both OPO_4 and NO_3.

Additional Comments

Good background of studies and improvements to watersheds listed. Williamson Ditch, Otter Creek, Williamson East Lateral, Williamson Main- Raw data of surface, groundwater and artesian water- nutrient budgets available, hydrographs. Range of variables and loads.

Allen, M. S., and K. I. Tugend. 2000. Effects of habitat enhancement on habitat quality and largemouth bass recruitment at Lake Kissimmee, Florida. Proceedings of the 130th AFS Annual Meeting. American Fisheries Society, Bethesda, Maryland, USA.
Reference ID: 559
Keywords: Lake Kissimmee/Largemouth bass/Habitat
Notes: Paper no 2003

Allen, M. S., K. I. Tugend, and M. J. Mann. 2003. Largemouth bass abundance and angler catch rates folloing a habitat enhancement project at Lake Kissimmee, Florida. North American Journal of Fisheries Management 23:845-855.
Reference ID: 533
Keywords: Lake Kissimmee/Fish
Abstract: A habitat enhancement project was conducted at Lake Kissimmee, Florida, during 1995-1996 to improve fish habitat and remove dense inshore vegetation caused by stabilized water levels. We evaluated abundance of age-1 (<250 mm total length [TL]) and adult (fish at least 356 mm TL and all sizes of fish caught by anglers) largemouth bass Micropterus salmoides before and after the habitat enhancement. Mean electrofishing catch per hour (CPH) of age-1 largemouth bass increased significantly after the 1995-1996 habitat enhancement, suggesting strong year-classes for 2 years after the habitat enhancement (i.e. 1997-1998 year-classes). Growth of age-1 largemouth bass also increased following habitat enhancement; mean total length of age-1 fish averaged 143 mm before enhancement and 186 mm after enhancement. Catch curves conducted in 2001 and 2002 corroborated historical electrofishing data indicating that the 1997 and 1998 year-classes were abundant as adults compared with other year-classes in the age frequencies. Age-1 largemouth bass electrofishing catch rates were not related to seasonal water levels or coverage of Hydrilla verticillata. Despite the rapid growth rates and high abundance of the 1997 and 1998 year-classes, neither electrofishing catch rates of largemouth bass at least 356 mm TL nor angler catch rates of largemouth bass (fish/h, all sizes of fish, harvested or released; data from creel surveys) differed significantly between preenhancement and postenhancement periods. Thus, we were unable to detect a change in adult largemouth bass abundance or angler catch rates following the habitat enhancement. Fishing effort directed toward largemouth bass declined after enhancement for the winter period (November-February) but did not differ significantly between preenhancement and postenhancement periods for the summer (May-August) period. Benefits of muck removal concurrent with lake drawdowns include increased recreational opportunities and improved habitat. However, our results indicate that fish population responses to drawdowns and muck removals may vary and detecting effects on the adult largemouth bass populations can be difficult. Therefore, habitat enhancement efforts should focus on lakewide recreational benefits rather than benefits to a single preferred species (e.g. largemouth bass).

Allen, M. S., and K. I. Tugend. 2001. Effects of habitat enhancement on largemouth bass recruitment and habitat quality at Lake Kissimmee. University of Florida, Department if Fisheries and Aquatic Sciences, Gainesville, Florida, USA.
Reference ID: 500
Keywords: KCOL/Fish/Largemouth bass/Lake Kissimmee/Agustin Valido
Notes: Recorded by Brent Anderson 5/23/2005

Allen, M. S., and K. I. Tugend. 2002. Effects of a large scale habitat enhancement project on habitat quality for age-

0 largemouth bass at Lake Kissimmee, Florida. University of Florida, Department of Fisheries and Aquatic Sciences, Gainesville, Florida, USA.

Reference ID: 473
Keywords: KCOL/Lawrence Glenn/Fish/Lake Kissimmee/Largemouth bass/Vegetation
Notes: (Not in reference center)

Abstract: A habitat enhancement project was conducted from 1995-1996 to remove macrophytes and organic matter from about half of the 80-km shoreline of Lake Kissimmee, Florida. Habitat quality was evaluated in enhanced and control areas (i.e., debilitated areas left intact after enhancement) and largemouth bass density and growth in enhanced sites from 1998-2000. Control sites were characterized by low dissolved oxygen throughout the day (mean < 2 mg/L), high aquatic macrophyte biomass (>50 kg/m super(2)), and the percent of coverage of aquatic macrophytes (PAC) from 100 percent. Qualitative fish sampling in control sites yielded no sport-fishes. Enhanced sites generally had mean DO greater than 4 mg/L, relatively low aquatic macrophyte biomass (mean < 5 kg/m super(2)), and intermediate PAC (5-90%). Mean density of age-0 largemouth bass in enhanced sites averaged about 100 fish/ha from May-August of both years and was positively related to PAC in block nets in 1998. Growth rates of age-0 largemouth bass in 1998 and 1999 were rapid compared to historical records at Lake Kissimmee and a database of records of 56 Florida lakes. Diet analysis of age 0 largemouth bass revealed that fish were important prey (>30% of diets by weight) from June-March of both years. Early piscivory of age-0 largemouth bass probably resulted in rapid growth rates. The habitat enhancement project created quality habitat for age-0 largemouth bass at Lake Kissimmee, and benefits were prolonged relative to previous enhancement efforts at another lake.

Ammon, D. C., W. C. Huber, and J. P. Heaney. 1977. Multipurpose storage treatment analysis of a freshwater marsh. Florida Technological University, Orlando, Florida, USA.

Reference ID: 301
Keywords: Kissimmee Basin/Okeechobee County/Chandler Slough/Surface water/Nutrients/ Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/18/2005

Brief Description of Study
This report is an evaluate peak runoff attenuation and treatment efficiently of a freshwater marsh receiving agricultural runoff. Main objective was to determine the ability of natural marshes to serve as quantity and quality control areas. Chandler Slough was chosen for the study.

Study Conclusions
The overall removal of phosphorus is 6.73% indicating the marsh in 1975 is not effective in removing the nutrients. There is an apparent removal of 3.4% for chloride which suggests dilution and a lower actual removal of total phosphorous than indicated. First flush is noticed June though July where much of previous years deposition is released. Mass loads to and from the marsh indicate that in 1975 the marsh was ineffective in the net removal of total phosphorous. Most of the year the marsh acts as a sink for total phosphorus but during the initial and largest runoff event of the year much of the previous years deposition was released. Regulating marsh stage outflows will moderate nutrient releases.

Additional Comments
Pollution graph of total P
Pond Chlorine load only

Anderson, W. 1971. Temperature of Florida streams. (Map). Florida Bureau of Geology.

Anderson, W., and B. F. Joyner. 1966. Availability and quality of surface water in Orange County, Florida. (Map). Florida Bureau of Geology.

Anonymous. 1996. Lake Kissimmee Drawdown. Aquatic Plant Control Operations Support Center, U.S. Army Corps of Engineers Information Exchange Bulletin 9:6-7.
Reference ID: 518
Keywords: Vegetation/Lake Kissimmee

____. Date unknown. Lake Kissimmee (Preliminary Draft). South Florida Management District, Publication information unknown.
Reference ID: 317
Keywords: Kissimmee Basin/Osceola County/Lake Kissimmee/Nutrients/Water quality/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/18/2005 **(not in reference center)**

Brief Description of Study
Report concludes a partial (6 month) study of Lake Kissimmee to establish a database for subsequent investigations and to determine present trophic conditions in the chain of lakes. 26 sample stations located at one mile intervals across 4 northeast-southwest transects were used for this study. The report emphasizes 6 centrally located stations which were found to be statistically representative of their respective transect counterparts.

Study Conclusions
pH levels were determined by balancing effects of slightly acidic inflows and CO_2 depletion by photosynthesis. Diurnal stratification due to photosynthesis was greatest in July than December due to different productivity rates. D.O. was determined by photosynthesis in summer, temperatures and wind in the winter. Diurnal stratification of D.O. was frequent and vertical profiles were parallel to pH for some dates. Kissimmee River inflow (C-37) is the primary N source. Data indicate plankton use NH_4 preferentially over NO_3. Total P positively correlated with flow, orthophosphate inversely correlated with Chlorophyll a. Chlorophyll a ranged from 0-76 mg/l and positively correlated with flow and production. Wind mixing of sediments was prime importance to secchi transparency. Total Fe exhibited decreasing gradient downstream in Lake Kissimmee due to inflow of acidic Fe rich waters of C-37 and Taylor Creek to north due to increased flow, conductivities were higher in July than December. The data suggests that the lake acts as a nutrient sink for allochthanous materials from upper chain by Kissimmee River series of canals. Flow during the wet season appears to have a major impact on nutrient availability and transparency and thus primary productivity. Wind mixing appears to play a major role in recirculation of nutrients, eliminating stratification of various physical and chemical parameters and decreasing transparency.

____. Date unknown. Mechanical removal of organic sediments from Lake Tohopekaliga during the 1987 extreme drawdown. Unpublished report on file in Place of publication unknown.

Anthony, D. S. 1972. Lake Okeechobee-Polishing pond for East Central Florida. University of Miami, Division of Applied Ecology, Center for Urban and Regional Studies, Miami, Florida, USA.
Reference ID: 318
Keywords: Kissimmee Basin/Lake Okeechobee/Nutrients/Water quality/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/18/2005

Study Conclusions
The waters of the Kissimmee-Okeechobee system are receiving an overdose of nutrients. Continued overdosing will result in the collapse of Lake Okeechobee. Only the timing is uncertain. This overdose of nutrients is due to man's activity. The major source of nutrients to Lake Okeechobee (1969-1970) was via the Kissimmee River with substantial input from rain and other tributaries. The nutrient sources are sewage, agricultural runoff, and urban runoff. To ensure survival of Lake Okeechobee, we must reduce nutrient input into tributaries of Lake Okeechobee (advanced waste treatment and modify agricultural practices and discontinue back pumping, set extensive flow through marches for tributaries, increase fishing, weed

removal).

Additional Notes
The only data was some nutrient load data taken from USGS 69-70.

Anthony, J. L., and J. A. Downing. 2003. Physical impacts of wind and boat traffic on Clear Lake, Iowa. Lake and Reservoir Management 19:1-14.

Reference ID: 607

Keywords: Brad Jones/Water quality/Boats/Internal loading/Nutrients/Resuspension/Sediment/Turbulence/Wind

Notes: Recorded by Brent Anderson 6/02/2005

Abstract: Clear Lake is a shallow (Z_{mean} = 2.9 m), eutrophic (TP_{mean} = 188 $\mu g \cdot L^{-1}$) lake that is intensively used for recreation. After a century of intense agriculture in the watershed, the bottom is covered with nutrient-rich organic sediments. We monitored wind, boat traffic and turbidity and found that resuspension of this sediment by wind-induced waves and recreational boat traffic contributes to daily, often substantial, nutrient fluxes. Intensive monitoring over a wind-event showed that total phosphorus concentrations can increase by 100% over a diel period and ammonia concentrations increase to levels near to those toxic to fish at the peak of winds. GIS of the digitally analyzed lake basin coupled with physical models show that when wind speeds exceed 10 $m \cdot s^{-1}$ (22 mph), >46% of the lake's benthic surface area may become mobile. Wind speeds >20 $m \cdot s^{-1}$ (44 mph) can mobilize >98% of the lake bottom sediment surface area. The correlation between boat traffic and sediment resuspension was weak (r^2 = 0.23) in near-shore monitoring due to confounding by wind and other factors but heavy boat traffic appears to exacerbate wind-induced resuspension and may slow the resettlement of resuspended sediments. Boat traffic correlated with up to 50% increases in turbidity. Resuspension of sediments by boats is likely to occur across 56% of the lake area. Benthic sediment resuspension may contribute to the suppression of fish and macrophyte communities, domination of the phytoplankton community by Cyanobacteria, suspension of toxic ammonia, and increased restoration time-scales.

Ard, T. B. 1971. Deterioration of water quality for sanitary landfill and septic tanks in the South Florida Water Basin and Kissimmee Valley. Publication information unknown.

Reference ID: 88

Keywords: Kissimmee Basin/Istokpoga Basin/ Water quality/Highlands County/Glades County/Polk County/Okeechobee County/Orange County/Osceola County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/18/2005 (publication info not listed in report)

Brief Description of Study
The study provides information on sewage projects, locations, (Kissimmee and South Florida basins) and average composition of sewage effluent. The purpose of providing this information is to show that the largest part of the growth of these two basins is on collection and treatment; and all treatment processes meet the State of Florida Department of Pollution Control requirement of 90% or better. It should be pointed out that while one of our earlier concerns in waste treatment was for bacteria reasons, we know today that we must be concerned with urology and microchemistry to include chronic toxicity effects of trace elements.

Additional Comments
No chemistry except for the average composition of secondary sewage treatment effluent and the amount added by reuse of the undiluted product. No discussion of Kissimmee Basin effluent (except tabular statements indicating lbs. of solid waste/day, number of incinerators, number of projects by county and cost.

Ardamon and Associates, Inc. 1973. Summer conditions of water quality. Ardamon and Associates, Inc., Orlando, Florida, USA.

Reference ID: 69
Keywords: Summer conditions/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Arthur D. Little, Inc. 1971. Field evaluation no. 15- Kissimmee River. Arthur D. Little, Inc., Okeechobee, Florida, USA.
Reference ID: 70
Keywords: Kissimmee Basin/Okeechobee County/Kissimmee River/Nutrients/Water quality/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/18/2005

Brief Description of Study
This report is a field evaluation and orientation for Army Corps of Engineers.

Study Conclusions
The USGS and Army Corps of Engineers released a report in 1971 showing results of a 2 year study. Kissimmee River accounts for 1/3 dissolved solids imputed to Lake Okeechobee. Kissimmee River contributes 40% of N and 37% of total P. Water quality shows some evidence of organic enrichment.

Additional Comments
No raw data or conclusions

Bachmann, R. W., C. A. Horsburgh, L. K. Mataraza , and D. E. Canfield, Jr. 2002. Relations between trophic state indicators and plant biomass in Florida lakes. Hydrobiologia 470:219-234.
Reference ID: 562
Keywords: Vegetation/Nutrients
Abstract: We collected quantitative data on macrophyte abundance and water quality in 319 mostly shallow, polymictic, Florida lakes to look for relationships between trophic state indicators and the biomasses of plankton algae, periphyton, and macrophytes. The lakes ranged from oligotrophic to hypereutrophic with total algal chlorophylls ranging from 1 to 241 mg m^{-3}. There were strong positive correlations between planktonic chlorophylls and total phosphorus and total nitrogen, but there were weak inverse relationships between the densities of periphyton and the trophic state indicators total phosphorus, total nitrogen and algal chlorophyll and a positive relationship with Secchi depth. There was no predictable relationship between the abundance of emergent, floating-leaved, and submersed aquatic vegetation and the trophic state indicators. It was only at the highest levels of nutrient concentrations that submersed macrophytes were predictably absent and the lakes were algal dominated. Below these levels, macrophyte abundance could be high or low. The phosphorus–chlorophyll and phosphorus–Secchi depth relationships were not influenced by the amounts of aquatic vegetation present indicating that the role of macrophytes in clearing lakes may be primarily to reduce nutrient concentrations for a given level of loading. Rather than nutrient concentrations controlling macrophyte abundance, it seems that macrophytes acted to modify nutrient concentrations.

Bachmann, R. W., M. V. Hoyer, and D. E. Canfield, Jr. 2001. Evaluation of recent limnological changes at Lake Apopka. Hydrobiologia 448:19-26.
Reference ID: 393
Keywords: KCOL/Brad Jones

____. 2000. The potential for wave disturbance in shallow Florida lakes. Lake and Reservoir Management 16:281-

291.
Reference ID: 570
Keywords: Brad Jones/Water quality/Ratio/Resuspension/Shallow lakes/Sediments/Water quality/Waves
Notes: Recorded by Brent Anderson 5/31/2005
Abstract: We applied wave theory to calculate the extent and frequency that we would expect wave-driven surface water movements to disturb the sediments in 36 Florida lakes covering a broad range of surface areas and mean depths. The calculated per cent of the lakebed subject to wave disturbance at one time or another ranged from 6 to 100% and the per cent of the time 50% of the lakebed was disturbed ranged from 0 to 65%. The large Florida lakes, Apopka, Okeechobee, and Istokpoga showed high levels of calculated wave disturbance, which was consistent with the conclusions of previous investigations. Historic water level fluctuations in Lake Apopka were calculated to have major effects on wave disturbance in that lake. The dynamic ratio (the square root of lake surface area in square kilometers divided by the mean depth in meters) was significantly related to various measures of wave disturbance in our sample lakes. For lakes with ratio values above about 0.8 the entire lakebed was subject to wave disturbance at least some of the time. The dynamic ratio was also related to lake water quality. We found that increases in the dynamic ratio were significantly related to decreases in water quality as measured by total phosphorus, total nitrogen, chlorophyll, and Secchi disk depth. Calculations of wind disturbance by waves need to be modified in lakes with extensive beds of macrophytes, where water levels change and in periods where climatic fluctuations result in changes in wind regimes.

____. 2003. Predicting the frequencies of high chlorophyll levels in Florida lakes from average chlorophyll or nutrient data. Lake and Reservoir Management 19:229-241.
Reference ID: 615
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 1999. The restoration of Lake Apopka in relation to alternative stable states. Hydrobiologia 394:219-232.
Reference ID: 392
Keywords: KCOL/Brad Jones

____. 2001. Sediment removal by the Lake Apopka marsh flow-way. Hydrobiologia 448:7-10.
Reference ID: 391
Keywords: KCOL/Brad Jones

Bachmann, R. W., M. V. Hoyer, C. Fernandez, and D. E. Canfield, Jr. 2003. An alternative to proposed phosphorus TMDLs for the management of Lake Okeechobee. Lake and Reservoir Management 19:251-264.
Reference ID: 616
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Bachmann, R. W., B. L. Jones, D. D. Fox, M. Hoyer, L. A. Bull, and D. E. Canfield, Jr. 1996. Relations between trophic state indicators and fish in Florida (USA) lakes. Canadian Journal of Fisheries and Aquatic Science 53:842-855.
Reference ID: 395
Keywords: KCOL/Brad Jones

Baker, L. A., P. L. Brezonik, and C. R. Kratzer. 1981. Nutrient loading- Trophic state relationships in Florida lakes. Publication No. 56. University of Florida, Department of Environmental Engineering, Gainesville, Florida, USA.

Baldwin, L. B. 1975. Agriculture practices to reduce non-point pollution in the Okeechobbe-Kissimmee Basin. Technical Series 1(4). Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

____. 1978. Optimization of runoff detention for non-point pollution control. Technical Paper No. 78-2049. Americal Society of Agricultural Engineering, University of Florida, Gainesville, Florida, USA.

Barada, W. K., and The Environmental Information Center. 1976. The Kissimmee Chain of Lakes- A mismanaged tourist bonanza. Florida Conservation Foundation, Inc. Winter Park, Florida, USA.

Reference ID: 321

Keywords: Kissimmee Basin/Lakes/Surface water/Water quality/Nutrient loading/Nutrients/Lake Okeechobee/Lake Tohopekaliga/Shingle Creek/Kissimmee Chain of Lakes/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

This report describes the drainage history, lake level manipulation, drawdown, economic value, lakeshore economics and pollution.

Study Conclusions

Studies by the FCD and FDER determined that at present, Kissimmee River does not transport sufficient nutrients from upper Kissimmee Basin lakes to pose a serious threat to Lake Okeechobee. Lake Kissimmee is serving as a nutrient sink for pollution transported from upper Kissimmee Lakes. However, if present levels of overenrichment in Lake Tohopekaliga are not significantly reduced, the system will begin to transport nutrients downstream to other Lake ultimately reaching Lake Okeechobee. Shingle Creek is the greatest single source of Lake Tohopekaliga pollution.

Additional Comments

Good history of the lakes. All streams and lakes of chain are included.

Barada, W. R. 1980. Lake Tohopekaliga. Victim of the study it-to-death syndrom. Newsletter 80(5). Environmental Information Center of the Florida Conservation Foundation, Winter Park, Florida, USA.

Reference ID: 302

Keywords: Lake Tohopekaliga/Nutrients/Osceola County/Kissimmee Basin /Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brad Jones personal copy

Brief Description of Study

This report reviews the history of Lake Tohopekaliga's pollution story as an example of a disease that is threatening many other Florida resources

Additional Comments

Good chronological reference of reports written to date on Lake Tohopekaliga. Has some data by Game and Fish on P concentrations in all major lakes, sewage discharge load, and Shingle Creek quality.

Battoe, L. E., M. F. Coveney, E. F. Lowe, and D. L. Stites. 1999. The role of phosphorus reduction and export in the restoration of Lake Apopka, Florida. Pages 511-526 in K. R. Reddy, G. A. O'Connor, and C. L. Schelske, editors. Proceedings of the Symposium on Phosphorus biogeochemistry in subtropical ecosystems. Lewis Publishers, Boca Raton, Florida, USA.

Reference ID: 555

Keywords: Lake Apopka/Phosphorus

Beachler, M. M., and D. F. Hill. 2003. Stirring up trouble? Resuspension of bottom sediments by recreational watercraft. Lake and Reservoir Management 19:15-25.

Reference ID: 608

Keywords: Brad Jones/Water quality/Boating/Recreational conflicts/Sediment resuspension/Hydrodynamics

Notes: Recorded by Brent Anderson 6/02/2005

Abstract: An experimental and theoretical study of the hydrodynamic impacts of recreational watercraft in shallow waterbodies is presented. Of particular interest is the ability of turbulent prop or jet wash to resuspend bottom sediments. Intuition suggests, and the experiments confirm, that this ability is a strong function of boat speed and water depth.

The results of this study demonstrate that boats operating at high speed have no greater impact on the lake

bed than boats traveling at idle speeds. The greatest impact is seen when boats are traveling at _'near-plane' speeds. This critical speed is a function of boat size and water depth.
To increase the usefulness of the observations, a theoretical model of the flow underneath a passing boat was developed and validated with the data. Relying on only a few input parameters, the model can be used to estimate, for example, the minimum operating depth required for a given boat to prevent sediment resuspension.
Discussion of the relevance of this work in the context of setting use restrictions for watercraft is provided.

Beaver, J. R., and T. L. Crisman. 1982. The trophic response of ciliated protozoans in freshwater lakes. Limnology and Oceanography 27:246-253.

Reference ID: 74

Keywords: Kissimmee Basin/Istokpoga Basin/East Lake Tohopekaliga/Lake Tohopekaliga/Lake Annie/Highlands County/Lake Francis/Lake Jackson/Osceola County/Lake Placid/Glades County/Okeechobee County/Polk County/Orange County/Osceola County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Study Conclusions
Both abundance and biomass of ciliates were positively related to trophic state. As the trophic state increased, large ciliates were replaced with small bodied ciliates, due to food availability. Of the 5 lakes, Lake Annie and Lake Jackson were considered oligotrophic and the remaining 3 were mesotrophic.
Additional Comments
The exact location of the sampling in lakes is unknown, therefore chlorophyll data which generated trophic state may not be representative, especially for Lake Tohopekaliga. Analyses included secchi disc, color, N and P and Chlorophyll a, monthly but not reported. Mean annual Chl a were used to calculate trophic state of Carlson '77. Statistics included - No data was actually included in this paper - only a reference to the fact that it was collected. Discrepancies to observed literature levels suggested as artifacts of analytical techniques. Report is primarily biological.

Abstract: The abundance, biomass, composition, and size distribution of planktonic ciliated protozoans were analyzed monthly during 1979 along a trophic gradient represented by 20 Florida lakes. Both the abundance and biomass of ciliates were positively related to trophic state. Eutrophic assemblages were codominated by members of the Scuticociliatida, Oligotrichida, and Haptorida; oligotrophic lakes were dominated principally by the Oligotrichida. In addition to a compositional shift, large-bodied ciliates (40-50 pm) were progressively replaced by small-bodied ciliates (2030 pm) as trophic state increased. The response is attributed to changes in food availability. Small-bodied (~30 pm) bactivorous taxa are reduced in oligotrophic lakes where bacterial concentrations arc limiting and are replaced by those largerbodied taxa (>30 pm) able to ingest nannoplanktonic algae in addition to bacteria.

Bedient, P. B. 1974. An evaluation of drawdown and nutrient loading in Lake Tohopekaliga. Report done for class. Not a reference source.

Reference ID: 319

Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/Water quality/Southport Canal/C-35/Shingle Creek/Partin Canal/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
The discussion of this report is concerned with possible restoration schemes for Lake Tohopekaliga, which have been tried in the past. Emphasis is placed in natural vs. regulated lake fluctuations, lake drawdown, land use and hydrology, water quality and nutrient budgets.

Study Conclusions
Land use in Lake Tohopekaliga basin was demonstrated by agriculture interests, unimproved pasture, and marsh/swamp areas up until 1958. Since lake regulation, large areas have been converted to improve pastures and urban areas for 1972. Improved pasture increases drainage and runoff. Nutrient loads from agricultural areas are simultaneously increased. General response to lowered water level and reduced

volume was a gradual increase in concentration of most constituents and a reduction as reflooding progressed. NH_3 and NO_3 were little affected, total organic nitrogen increased. Spatial distribution in the lake for many variables shows progressively lower concentrations from north to south. Most major pollution sources enter at northern side of the lake. Loading rates for P exceeded dangerous levels and N exceeds Vollenweider's Values. The lake is receiving dangerous levels of N and P mostly from sewage treatment plants in Shingle Creek and P loadings are 3 times as high as N rates. Based on nutrient budget, sewage contributes 70% of N and 100% of P to net lake income.

Additional Comments
Discussion of land use and hydrology are presented for the lake. Report includes before, draining, and after drawdown of lake. Includes flow characteristics from 5 sewage plants discharged to lake.

Bedient, P. B. 1975. Hydrologic-land use interactions in a Florida river basin. Ph.D. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 75
Keywords: Kissimmee Basin/Water quality/Kissimmee River/Nutrients/Oak Creek/Chandler Slough/Yates Marsh/Ice Cream Slough/Maple River/Blanket Bay/Pine Island Slough/Okeechobee County/Glades County/Highlands County/Osceola County/Orange County/Polk County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
The problem investigated by this report revolves around the question of balancing agricultural and urban expansion with environmental quality measured as hydrologic and water quality responses in a river basin. The main objective of this report was to describe and quantify various and hydrologic- land use interactions which occur within a watershed or river basin in order that environmental quality is maintained.

Study Conclusions
Water quality degradation in the form of excess nutrient loading in one of the upper lakes and along the river has been increasing over the last 2 decades. Lake Tohopekaliga is the primary recipient of nutrients contained in the effluent from 5 sewage treatment plants. Agricultural runoff provides additional source. Phosphorus is the most responsive parameter- no significant variation observed for N levels. This can be explained by the assumption that P tends to be absorbed by soil particles and is available for surface transport via runoff and erosion. On the other hand, most N forms are soluble and can be leached from soil or returned to the atmosphere, thus precluding any relationship with surface transport. Wet season average concentrations are high in Lake Tohopekaliga but decline rapidly before reaching Cypress Lake. Concentrations further reduced to Lake Kissimmee. From the outlet of Lake Kissimmee to S-65C, levels remain fairly low, but increase rapidly between that point and S-65E. High P levels in Lake Tohopekaliga are primarily due to nutrient loading from treated sewage. Tributary inflow to the Kissimmee River did not yield any significant variation of total N, but total P levels showed a pronounced increase in the wet season concentrations south of S-65C. Ice cream and Pine I slough produced very low levels throughout the year while Oak Creek, Chandler slough, Yates Marsh and Maple River yielded progressively higher loading concentrations. Blanket Bay I Pool A yielded high values, but Lake Kissimmee inflows and Ice Cream Slough kept the average concentration low. It appears that high P levels in the river are a direct result of tributary loadings, especially south of S-65C.

Bedient, P. B., W. C. Huber, and J. P. Heaney. 1976. Modeling hydrology-land use interactions in Florida. Pages 362-366 in U.S. Environmental Protection Agency, editor. Proceedings of the conference on environmental modeling and simulation. U.S. Environmental Protection Agency, Washington D.C., USA.
Reference ID: 76
Keywords: Kissimmee Basin/Osceola County/Kissimmee River/Water quality/Nutrients/KCOL/ Brad Jones
Notes: Recorded by Brent Anderson 5/10/2005

Brief Description of Study
A modeling technique was developed to quantify various hydrologic-land use interactions in order to

analyze the environmental effects of surface drainage networks on the Kissimmee River Basin. An environmental simulation model was applied to each soil-land use type within each subwatershed to provide a continuous estimate of total storage, surface runoff and base flow. Potential nutrient loading rates were calculated using measured concentrations of P and predicted runoff volume.

Study Conclusions
Model results from 7 subwatershed indicate that higher nutrient concentrations and loading rates are associated with areas dominated by intense drainage.

Additional Comments
Data in the model was taken from USGS and FDC records. No raw data or loads. Conference presentation is based upon PhD dissertation- See also Author and Title, same topic for more details.

Beiderman, C. A., A. R. Thompson, C. W. Dye, and L. T. Ross. 1981. Phytoplankton and periphyton community dynamics of detention/retention wetlands. Second annual report. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Reference ID: 78

Keywords: Kissimmee Basin/Osceola County/Okeechobee/Okeechobee County/Armstrong Slough/Ash Slough/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
Baseline studies of phytoplankton and periphyton community structure and dynamics were conducted in two freshwater mashes in the Kissimmee River Valley. The second year of analyses includes productivity studies, nutrient concentrations as well as the same elements found in the first report. Both sites receive runoff from pastures used for beef production and associated agricultural activities.

Study Conclusions
Biomass, productivity, nutrient levels, and dominant algae genera suggest that one site (Armstrong Slough) may be moderately enriched while the other (Ash Slough) may be highly enriched. As a % of the total algae population, Blue-greens dominated both systems annually while greens were secondary in abundance. Mean values of 8.19×10^5 algal unit/ml and 66.58 mg/m3 phaeophyton corrected chl a. Phytoplankton primary production and community metabolism production mean values were 57.29 mg/m^3/hr and 18.77 mg C/m^2 /day respectfully. No seasonal trends were noted.

Additional Comments
Chemistry samples collected twice each sampling month. Seasonal nutrient fluctuations for all stations at each site were averaged by site since no significant difference was noted between stations. Raw data as graphics only.

Biederman, C. A., A. R. Thompson, C. W. Dye, and L. T. Ross. 1980. Phytoplankton and periphyton community dynamics of detention/retention wetlands. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Reference ID: 77

Keywords: Kissimmee Basin/Osceola County/Okeechobee/Armstrong Slough/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
Baseline studies of phytoplankton and periphyton community structure and dynamics were conducted in two freshwater mashes in the Kissimmee River Valley. Both sites receive runoff from pastures used for beef production and associated agricultural activities.

Study Conclusions
Dominant algal genera and biomass values suggested that both systems are highly enriched. The dominance of diatom populations expected in acidic, highly stained freshwater systems was not found. Blue greens

dominated both systems followed by greens. Mean values of 2.5 x 10^5 algal units/ml and 120.7 mg/m^3 phaeophyton corrected chl a were determined. Corrected chl a values of 6.2 mg/m^2 and 1.3 g/m^2 ash free dry weight were determined for periphyton. Site pooled data showed no seasonal trends. Contrasts between sites were probably due to differing flow regimes and hydroperiods.

Additional Comments
No chemistry data were collected in conjunction with biological studies.

Black, A. P., and E. Brown. 1951. Chemical character of Florida's waters. Paper No. 6. Florida Board of Conservation, Division of Water Survey and Research, Tallahassee, Florida, USA.

Blancher, E. C. II, C. R. Fellows, D. Sompongse, and J. L. Fox. 1978. Nitrogen and phosphorous loading characteristics of the Lake Conway, Florida ecosystem. Preliminary Report. University of Florida, Department of Environmental Engineering, Gainesville, Florida, USA.
Reference ID: 83
Keywords: Lake Conway/Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Blancher, E. C. II, and C. R. Fellows, University of Florida, Department of Environmental Engineering. 1979. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Report 1, Baseline study. Technical Report A-78-2. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA.

____, University of Florida, Department of Environmental Engineering Sciences. 1982. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Report 2, First year poststocking results . Technical Report A-78-2. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, USA.

Blancher, E. C. II . 1979. Lake Conway, Florida: Nutrient dynamics, trophic state, zooplankton relationships. Ph.D. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 80
Keywords: Lake Conway/Nutrients/Lake/Kissimmee Basin/Okeechobee County/Lake Gatlin/Little Lake Conway/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
This is a study of external nutrient loadings to Lake Conway system, an interconnected series of three lakes. Basic purpose was to elucidate some of the relationships between nutrient loadings, trophic state and zooplankton dynamics.

Study Conclusions
Both N (2.6 g-N/m^2/yr) and P (0.22g-P/m^2-yr) inputs were within range of loadings that lead to mesotrophic conditions. Major external source of N and P were atmospheric, urban runoff and subsurface seepage. Total zooplankton abundance showed strong correlation ($r=0.87$, $\acute{\alpha}=0.01$) with trophic state indications. No indications of N limitation were found. Based on a model developed for system (1)sedimentation of P occurs at a rate higher than would be predicted from Vollenweider's (76) analyses (2) nutrient release by submersed macrophytes is an important process in P dynamics (3) release of P by sediments is not a significant internal source of this nutrient for Lake Conway. Seasonal variations in trophic state followed more closely the inputs of P from external sources rather than internal cycling of P from macrophytes.

Additional Comments
These lakes form the upper portion of the Boggy Creek drainage basin. Report contains a water budget, specific conductance, nutrient loads, secchi disc, chl a and productivity.

Bowden, J. P. 1975. An evaluation of drainage and storage alternatives in the Kissimmee River Basin. M.S. dissertation. University of Florida, Gainesville, Florida, USA.

Reference ID: 84

Keywords: Kissimmee Basin/Kissimmee River/Okeechobee County/Chandler Slough/water quality/nutrients/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study

The main objective of this research was to examine the effect of development on flooding and water quality by utilizing the marsh and swamp areas of the Kissimmee River Basin for the storage and treatment of agricultural runoff.

Study Conclusions

Study of the marsh area in Chandler Slough reveals that there is potential for flood attenuation and nutrient uptake when storm water runoff is routed through marsh and swamp areas. The amount of detention obtained from such a system has been shown to be directly related to the ratio of drainage to treatment area (about 25:1). Flood attenuation and nutrient uptake is significantly reduced when this ratio is exceeded.

Bowyer-Singleton and Associates/Camp, Dresser, and McKee, Consulting Team. 1981. Southwest Orange County 201 facilities planning program. Phase I. EPA project number C120692010. Bower-Singleton and Associates/Camp, Dresser, and McKee, Consulting Team, Orlando, Florida, USA.

Reference ID: 85

Keywords: Orange County/Facilities planning/Facilities Planning Program/Kissimmee Basin/Stream/Shingle Creek/Surface water/wastewater/Land use/Water management/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study

This report addresses Phase I of the Southwest Orange County 201 Facilities Planning Program including (1) water quality goals/objectives and wastewater allocation (2) summary of pollution sources (3) existing wastewater treatment systems (4) Existing collection systems (5) wastewater financial and management program summary (6) population and land use projections (7) wastewater flow and load projections (8) conceptual alternatives and (9) additional step 1 facilities planning work.

Brandes, R. J., H. O. Andrews, and F. S. Masch. 1975. Water quality modeling of C-38 in the lower Kissimmee River Basin. Final report to the Department of Administration, Division of State Planning. Project No. 31800. Water Resource Engineers, Inc., Austin, Texas, USA.

Reference ID: 86

Keywords: Water quality/C-38/Kissimmee Basin/Kissimmee River/Oak Creek/Chandler Slough/Yates Marsh/C-41A/Armstrong Slough/Skeeter Creek/Nutrients/Glades County/Highlands County/Okeechobee County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study

This study has as its fundamental goal the development of land and water management concepts which will alleviate current and future water quality problems related to nutrient enrichment of the basins water bodies. This work was part of the special project to prevent the eutrophication of Lake Okeechobee. This project has primarily been related to the application of water quality model to the C-38 portion of the Kissimmee River between Lake Kissimmee and Lake Okeechobee.

Study Conclusions

Total P concentrations greater, from 0.03 mg/l in upper reach of C-38 to 0.08 mg/l between S-65C and Lake Okeechobee. This indicates that the tributaries inflows along this reach contribute significant amounts of Total P. As reported by Lamands, 75 % of P load entering Lake Okeechobee from lower Kissimmee 1971-73 originated below S-65C while only less than 20% flow. Average total nitrogen concentrations along the length of the river do not exhibit ant significant increases due to influx of large tributary loadings, although concentration ranges do show some considerable variation. 85% of total nitrogen was organic

with the remainder mostly NO^3 and NH^4. BOD= 2.0mg/l. TOC increased rapidly from 12.5 mg/l to 18.0 mg/l near S-65A and remained at that level. High total P levels are indicated for Skeeter Creek, Armstrong Slough, Oak Creek, Chandler Slough, Yates, Marsh, Maple R. and C-41-A

Additional Comments
Much of the data collected or used was collected by the USGS and CSFCD. Data summaries provided for total P, total N, TOC and BOD.

Brenner, M., M. W. Binford, and E. S. Deevey. 1990. Ecosystems of Florida. Pages 364-391 in R. L. Myers, and J. J. Ewel, editors. Lakes.
Reference ID: 530
Keywords: Lake Kissimmee/Surface area
Abstract: Florida contains about 7800 lakes with surface area greater than 0.4 ha. Covering at least 9270 km super(2)--about 6 percent of the landscape--they are collectively about half the size of Lake Ontario, the smallest of the Great Lakes. Lake Okeechobee alone covers about one-fifth of the total area. Florida has a few large lakes and thousands of small ones. Five natural lakes in the state have surface areas greater than 100 km super(2). They include Lake Okeechobee (1770 km super(2)), Lake George (190 km super(2)), Lake Kissimmee (140 km super(2)), Lake Apopka (125 km super(2)), and Lake Istokpoga (112 km super(2)).

Brenner, M., T. J. Whitmore, M. S. Flannery, and M. W. Binford. 1992. Paleolimnological methods for defining target conditions in lake restoration: Florida case studies. Lake and Reservoir Management 7:209-217.
Reference ID: 595
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Brenner, M. T., J. Whitmore, J. H. Curtis, and C. L. Schelske. 1995. Historical ecology of a hypereutrophic Florida lake. Lake and Reservoir Management 11:255-271.
Reference ID: 587
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Brevard Engineering Company. 1972. Polk County Comprehensive Plan, water and sanitary sewer systems. Brevard Engineering Company, Place of publication unknown.
Reference ID: 87
Keywords: Polk County/Polk County Comprehensive Plan/Sewer systems/Water and sanitary/Sanitary sewer systems/Brad Jones/KCOL
Notes: Brent Anderson **(place of publication unknown)**

Brezonik, P. L., E. C. Blancher, V. B. Myers, C. L. Hilty, M. K. Leslie, C. R. Kratzer, G. D. Marbury, B. R. Snider, T. L. Crisman, and J. J. Messer. 1979. Factors affecting primary production in Lake Okeechobee, Florida, USA. University of Florida, Department of Environmental Sciences and Engineering, Gainesville, Florida, USA.
Reference ID: 90
Keywords: Lake Okeechobee/Kissimmee Basin/ Istokpoga Basin/Kissimmee River/Fisheating Creek/Nutrients/Taylor Creek/Nubbins Slough/Water quality/Indian Prairie Canal/Glades County/Highlands County/Okeechobee County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
Investigations were conducted on Lake Okeechobee (1) to determine the nutrient or nutrients that limit the role of primary production in the lake and in particular, the spatial and temporal variations in nutrient

limitation and (2) to evaluate the importance of various internal sources of nutrients to phytoplankton.

Study Conclusions
Pertaining to area of review (i.e. Kissimmee and Istokpoga Basins), the Kissimmee River and Fisheating Creek had annual ratios suggestive of N limitation. Using 4 years average budget from previous authors, 75% decrease in nutrient loads from Taylor Creek, Nubbins Slough basins would decrease N and P Loads from 3.86 and 0.32 g/ml^2/yr to 3.66 and 0.24 g/ml^2/year.

Additional Comments
Data mostly reflects Lake Okeechobee, but inflow data are available for Okeechobee and Glades Counties. Averages for each station are included.

Brezonik, P. L., E. S. Edgerton, and C. D. Hendry. 1980. Acid precipitation and sulfate deposition in Florida, USA. Science 208:1027-1029.
Reference ID: 91
Keywords: Kissimmee Basin/Istokpoga Basin/River/Kissimmee Chain of Lakes/Nutrients/Okeechobee County/Glades County/Polk County/Orange County/Osceola County/Highlands County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/21/2005

Brief Description of Study
Data supplies state-wide, general overview.

Study Conclusions
The acidity for rainfall in Florida has increased markedly in the past 25 years and the average SO4 and NO3- concentrations have increased by factors of 1.6 and 4.5 respectively. Annual average pH values <4.7 now occur over the northern l' of the state. Summer rainfall average pH is 0.2 to 0.3 units lower that winter and SO^4 concentrations at most sites are higher in summer. Annual deposition of H+ (300-500 eq/hectare) in North Florida is1/3 -1/2 of deposition in the heavily impacted N.E. U.S.; comparable figures for excess SO^4 (derived from SO^4 are 7-11 kg S/hectare- 50-90% of the SO^4 deposition rates for New Hampshire

Brezonik, P. L., E. S. Edgerton, C. D. Hendry, Jr., E. S. Edgerton, R. L. Shultze, and T. L. Crisman. 1983. Acidity, nutrients and minerals in atmospheric precipitation over Florida, USA: deposition patterns, mechanisms, and ecological effects. U.S. Environmental Protection Agency, Corvallis, Oregon, USA.
Reference ID: 92
Keywords: Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Brooks, H. K. 1974. Environments of South Florida: present and past, Memoir 2. Pages 256-286 in P. J. Gleason, editor. Lake Okeechobee. Miami Geological Society, Miami, Florida, USA.
Reference ID: 93
Keywords: Lake Okeechobee/Kissimmee River/ Kissimmee Basin/Istokpoga Basin/Fisheating Creek/Glades County/Taylor Creek/Okeechobee County/Water quality/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
Historical review of Lake Okeechobee and its tributaries. Also climate, hydrology, stratigraphy, structure, and geomorphology of Lake Okeechobee.

Additional Comments
The chapter includes material on the chemical composition of Kissimmee River. No nutrient data presented, although there is solids and metal data.

Brown, C. D., D. E. Canfield, Jr., R. W. Bachmann, and M. V. Hoyer. 1999. Evaluation of surface sampling for estimates of chlorophyll, total phosphorus, and total nitrogen concentrations in shallow Florida lakes. Lake and Reservoir Management 15:121-132.
Reference ID: 573

Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

____. 1998. Seasonal patterns of chlorophyll, nutrient concentrations and secchi disk transparency in Florida lakes. Lake and Reservoir Management 14:60-76.
Reference ID: 396
Keywords: KCOL/Brad Jones

____. 1998. Seasonal patterns of chlorophyll, nutrient concentrations and secchi disk transparency in Florida lakes. Lake and Reservoir Management 14:60-76.
Reference ID: 577
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Brown, C. D., M. V. Hoyer, R. W. Bachmann, and D. E. Canfield, Jr. 2000. Nutrient-chlorophyll relationships: an evaluation of empirical nutrient-chlorophyll models using Florida and north-temperate lake data. Canadian Journal of Fisheries and and Aquatic Science 57:1574-1583.
Reference ID: 397
Keywords: KCOL/Brad Jones

Brown, E., and J. W. Crooks. 1955. Chemical character of surface waters in the Central and Southern Florida Flood Control District. U.S. Department of the Interior Geological Survey, Ocala, Florida, USA.
Reference ID: 312
Keywords: Water quality/Kissimmee Basin/ Istokpoga Basin/Kissimmee River/Fisheating Creek/Indian Prairie Canal/C-40/Taylor Creek/Glades County/Osceola County/Highlands County/Okeechobee County/Nutrients/St. Johns River/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
The report presents investigative data whose objectives were to (1) determine the suitability of the ground and surface waters for domestic and industrial uses. (2) To detect any changes in chemical quality of these waters during and following the completion of improvement structures and to determine the causes of such changes. (3) Assist in evolution of the degree of attainment of objectives. The report includes information on Upper St. Johns, Kissimmee River Basin, Lake Okeechobee and South Florida.

Study Conclusions
Water flowing into the Lake from the Kissimmee River was very soft and of excellent quality. The study demonstrated little variation in concentration of any chemical constituents throughout the year. River water is generally of uniform composition. Analyses of samples collected at various intervals from these streams indicate that Fisheating Creek and Taylor Creek are similar in composition to the Kissimmee River, while Indian Prairie Canal is somewhat more mineralized.

Additional Comments
Raw water data at selected stations on selected dates are reported

Brush, J. M. and W. Kitchens. Date unknown. Avian community monitoring. Unpublished report on file in Tallahassee, Florida, USA.

Burger, J. 2003. Personal watercraft and boats: Coastal conflicts with common terns. Lake and Reservoir Management 19:26-34.
Reference ID: 609
Keywords: Brad Jones/Water quality/Disturbance/Terns/Personal watercraft/Boats/CoastalConservation/Co-management
Notes: Recorded by Brent Anderson 6/02/2005
Abstract: Human disturbance to nesting colonial birds has increased with the massive development of coastal regions and rapid improvement in technology of watercraft. Disturbance to nesting common terns

(Sterna hirundo) by boats was examined over a five-year period, with different degrees of management of personal watercraft (PWC) activities. In the five years before this study, reproductive success had declined to zero, perhaps due to excessive personal watercraft activity. Terns responded with significantly more upflights to PWCs that raced by and circled the island, than to motorboats that traveled slowly and remained in the channel. Public meetings and an educational campaign were successful in decreasing the percent of PWCs that raced and ran around the island, which in turn decreased the number of tem upflights and increased reproductive success. Without continued public meetings and education, PWCs began to race around the island, and the terns responded by moving from island edges to central area that were lower and vulnerable to tidal flooding. In the following year, designated areas for rental PWC use were established, which again decreased the PWC traffic, allowing the birds to nest on the island edges. All management practices increased reproductive success, but a combination of education, public meetings, increased signage, enforcement, and designated zones for PWCs resulted in the greatest increase in reproductive success. Involving stakeholders in the process allowed people and birds to coexist, but continued vigilance and public education were essential to successful management.

Burhler, D. A. 2000. Bald Eagle. The Birds of North America 1-32.
Reference ID: 328

Keywords: Eagle /Birds/Gary Williams/KCOL
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?
This document summarizes bald eagle ecology and biology

What parameters were monitored?
This is a review document

What was the geographic extent of monitoring?
Range-wide

How many samples or sample locations were monitored?
Not applicable

What was the sampling frequency and duration (period of record)?
Not applicable

Do these data cover the baseline or reference (pre-1960s) period?
Not directly applicable. Does discuss reproductive success of Florida nests during the reference and baseline periods, but discussion is not specific to Upper Basin.

Who collected the data?
Many researchers; review paper.

Where are the data located? (agency or organization maintaining database)
Not applicable

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Summarized

Is a summary of findings presented in the document?
No. Document reviews bald eagle ecology and biology and provides excellent summaries of this information.

Burton, T. M., R. C. Harriss, C. F. Dreyer, and D. H. Taylor. 1975. Studies of the geochemical exchanges across the sediment-water interface in the Kissimmee River-Lake Okeechobee Watershed. Technical Series 1(5). Department of Environmental Regulation, Tallahassee, Florida, USA.

Burton, T. M., R. Turner, and R. C. Harriss. 1977. Nutrient export from three north Florida watersheds in contrasting land use. Pages 323-342 in P. L. Correll, editor. Watershed research in Eastern North America. Tidemark Printing Company, Edgewater, Maryland, USA.

Reference ID: 95
Keywords: Water quality/Nutrients/Watershed/Land use/Brad Jones/KCOL
Notes: Brent Anderson

Butler, R. S., E. J. Moyer, M. W. Hulon, and V. P. Williams. 1992. Littoral zone invertebrate communities as affected by a habitat restoration project on Lake Tohopekaliga. Journal of Freshwater Ecology 7:317-327.

Reference ID: 330
Keywords: Macroinvertebrates/Joe Koebel/Lake Tohopekaliga/KCOL/Vegetation
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?

Provides some data on density and taxonomic diversity of benthic aquatic invertebrates in littoral vegetation habitats after an extreme lake drawdown.

What parameters were monitored?

Benthic invertebrates and invertebrates associated with littoral vegetation.

What was the geographic extent of monitoring?

Lake Tohopekaliga, Florida

How many samples or sample locations were monitored?

Methods are unclear. Simply states that littoral invertebrates were collected by dip net and corer.

What was the sampling frequency and duration (period of record)?

Unclear. Simply states that invertebrates were collected in 1988 and 1989.

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

FGFWFC (FFWCC)

Where are the data located? (agency or organization maintaining database)

FFWCC, Kissimmee, Florida

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Unknown

Are raw data and/or summarized data presented in the document?

The text contains a summary of t-test comparisons by transect between 1988 and 1989 for the most abundant megagroups, total megagroups, and total organisms from dip net and core samples. Density and species richness data are not presented.

Is a summary of findings presented in the document?

Yes, but summary is very general.

Comments: This study indicates a reduction in taxa richness and density of aquatic invertebrates associated with macrophytes in restored areas (where organic substrate was removed), as compared to control areas in 1988. One year later, densities were greater in restored areas, but taxonomic groups were still greater in control areas. Densities and taxa richness of benthic invertebrates were consistently higher in restored areas in 1988 and 1989.

Data are likely not useful for formulating performance measures for density, species richness, or relative abundance of benthic invertebrates.

J.W. Koebel Jr. 2/14/2005

Camp Dresser & McKee Inc. 1999. Restoring a natural lake system in Leon County, Florida. Camp Dresser & McKee Inc., West Palm Beach, Florida, USA.
Reference ID: 497
Notes: Recorded by Brent Anderson 5/4/2005

Chris Carlson personal copy

This report is for public awareness, there is no technical scientific data presented; just background on the project.

Abstract: Lakes and streams certainly enhance urban and suburban environments, but development and urbanization can take their toll on the neighboring water resources. In Leon County, Florida, development in the surrounding 72-square-mile watershed slowly transformed the Lake Monson system from a viable wildlife and recreational resource to a nutrient laden lake choked by aquatic vegetation and a sediment-filled delta. Determined to restore the Lake Munson system to a more natural state, Leon County turned to CDM to design and secure permits for a comprehensive restoration program that will improve the water quality, recreational use and fishery value of Lake Munson, while also reducing flooding throughout the system.

____. 1991. Upper Lake Tohopekaliga restoration area preliminary design final memorandum for the City of Kissimmee, Osceola County, and the South Florida Water Management District. Camp Dresser & McKee Inc., West Palm Beach, Florida, USA.
Reference ID: 484
Keywords: LTMP/Lake Tohopekaliga/Osceola County/Water quality/Nutrients/KCOL/Brad Jones/Chris Carlson
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
This report summarizes preliminary design for the improvements in the Mill Slough and City Ditch East watersheds. The improvements include restoration of a portion of Upper Lake Tohopekaliga north of Neptune Road to improve water quality and restore wetlands/lake area as well as provide flood control improvements in Mill Slough and City Ditch East. The primary purposes of this preliminary design analysis are to (1) determine the feasibility of providing treatment for stormwater runoff from Mill Slough, the East City Ditch, Park Street Storm Sewer System, and the Judge's Dairy Property (2) identify design criteria, data needs and design data for the proposed regional facility (3) provide assistance, on an as-

needed basis, in the acquisition of alternate funding for the project.

Caneub, Fleissig and Assiciates. 1971. Comprehensive Plan Summary- City of Sebring, Florida, USA. Caneub, Fleissig and Associates, Place of publication unknown.
Reference ID: 97
Keywords: Sebring/Brad Jones/KCOL
Notes: Brent Anderson **(place of publication unknown)**

Canfield, D. E., Jr. 1982. Prediction of chlorophyll a concentrations in Florida lakes: The importance of phosphorous and nitrogen. University of Florida, Center for Aquatic Weeds, IFAS, Gainesville, Florida, USA.
Reference ID: 307
Keywords: Kissimmee Basin/Istokpoga Basin/ Water quality/Nutrients/Okeechobee County/Glades County/Highlands County/Orange County/Osceola County/Polk County /Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
Models for the prediction of chl a were developed and tested using 223 lakes. The best model was: ln (chl a) = -5.73 + 0.269/n(TP) + 1.061n(TN) or in (chl a) = -5.73 + 1.06 ln (TN/TP) + 1.33 ln (TP) where chl a, TN + TP in mg/m^3.

Study Conclusions
The data supported the hypothesis that nitrogen is an important limiting nutrient in hypereutrophic lakes. TN/TP ratios ranged from 1.3-324. There is a significant relationship between TP and chl a, however it is not strong and not linear throughout the entire range of observed values. A strong relationship between TN and chl a was found, which was linear over the entire range.

Additional Comments
Data also utilized from Shannon, USEPA, and Baker, et al. Data used to generate the model includes more than one consideration of some lakes. Total P, Total N and chl a concentrations ranged from 3.3-2600 mg/m^3, 63.5-5700 mg/m^3 , and 0.4-277 mg/m^3, respectively. No specific lake data and no specific countries were presented.

____. 1983. Prediction of chlorophyll a concentrations in Florida lakes: The importance of phosphorus and nitrogen. Water Resources Bulletin 19:255-262.
Reference ID: 398
Keywords: KCOL/Brad Jones

____. 1982. Sensitivity of Florida lakes to acidic precepitation. University of Florida, Center for Aquatic Weeds, School of Forest Resources and Conservation, IFAS, Gainesville, Florida, USA.
Reference ID: 308
Keywords: Kissimmee Basin/Istokpoga Basin/ Okeechobee County/Polk County/Orange County/Osceola County/Highlands County/Glades County/Water quality/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
A survey of 165 Florida lakes was conducted to determine pH, total alkalinity and Ca hardness.

Study Conclusions
Mean lake pH ranged from 4.1-8.9. Mean total alkalinity ranged from 0.2-204 mg/l as $CaCO_3$ and mean hardness ranged from 0.7-215 mg/l. Total alkalinity averaged < 10 mg/l as $CaCO_3$ in 49% of the sampled lakes, thus suggesting that Florida has a large number of lakes potentially vulnerable to damage by aced rain. However, recent fisheries data suggest Florida lakes may not be sensitive as the alkalinity and calcite saturation indicies indicate. Consequently, prediction of future impacts and trends based on current indicies should be regarded cautiously. The author concludes that a majority of lakes can be classified as soft water lakes despite the presence of underlying limestone formation. Based on alkalinity ranges, 49% of sampled

lakes would be classified as highly sensitive to damage by acid precipitation and 10% would be moderately sensitive. This suggests further increases in rainfall acidity could adversely affect Florida lakes, especially those in north and central Florida where pH and alkalinity levels are already low.

Additional Comments
pH values are based on iced field samples transported to the lab. Report includes a general aerial mapping of values. The author also questions which indicies are more accurate and found some evidence that neither alkalinity or CSI index was the best indicator of the vulnerability of Florida lakes to acid rain damage. Nutrients variability also appears to play a very important role in the acid rain thresholds.

____. 2002. Will stringent phosphorus control improve the quality of Lake Okeechobee? Aquatics 24:8-15.
Reference ID: 399
Keywords: KCOL/Brad jones

Canfield, D. E., Jr., R. W. Bachmann, and M. V. Hoyer. 2000. A management alternative for Lake Apopka. Lake and Reservoir Management 16:205-221.
Reference ID: 400
Keywords: KCOL/Brad Jones

Canfield, D. E., Jr., C. D. Brown, R. W. Bachmann, and M. V. Hoyer. 2002. Volunteer lake monitoring: Testing the reliability of data collected by the Florida Lakewatch Program. Lake and Reservoir Management 18:1-9.
Reference ID: 401
Keywords: KCOL/Brad Jones

Canfield, D. E., Jr., and L. M. Hodgson. 1982. Prediction of secchi disc depths in Florida lakes: Impact of algal biomass and organic color. University of Florida, Center for Aquatic Weeds, IFAS, Gainesville, Florida, USA.
Reference ID: 309
Keywords: Kissimmee Basin/Istokpoga Basin/ Orange County/Polk County/Glades County/Highlands County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/12/2005

Brief Description of Study
A model for predicting secchi disc depth in Florida Lakes from data from 205 lakes as ln (SD)= 2.01 0.370 ln (chl a) 0.298 ln © where SD = secchi depth (m), chl a (mg/m^3) and C = organic color (mg/l as Pt.) Good confidence limits (95%) of 93-108% of calculated secchi's.

Study Conclusions
Indications are that organic color concentrations do not affect lake secchi disk depths as much as algal levels. Further reductions in the remaining error could include a variable for suspended inorganic sediments. Secchi's range from 0.2 8.1 m. Chl a range from 0.46 157 mg/m^3 and color ranges from 0 433 mg/l as Pt. Data suggests strong hyperbolic relationship between chl a and secchi, and secchi and water color. For many of Florida lakes improvement in water clarity can be accomplished strictly by reducing nutrient load consequently reducing algal biomass.

Additional Comments
Data includes chl a and secchi disc. This model will not work in lakes having significant concentrations of inorganic sediments. A term for nonalgal turbidity or inorganic sediments needs to be added to the predictive model.

____. 1983. Prediction of Secchi disc depths in Florida lakes: Impact of algal biomass and organic color. Hydrobiologia 99:51-60.
Reference ID: 402
Keywords: Kissimmee Basin/Istokpoga Basin/Orange County/Polk County/Glades County/Highlands County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/12/2005

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Additional Comments

Data includes chl a and secchi disc. This model will not work in lakes having significant concentrations of inorganic sediments. A term for nonalgal turbidity or inorganic sediments needs to be added to the predictive model.

Canfield, D. E., Jr., and M. V. Hoyer. 1992. Aquatic macrophytes and their relation to the limnology of Florida lakes. University of Florida, Gainesville, Florida, USA.
Reference ID: 404
Keywords: KCOL/Brad Jones/Vegetation

____. 1988. The eutrophication of Lake Okeechobee. Lake and Reservoir Management 4:91-100.
Reference ID: 599
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 1988. Regional geology and the chemical and trophic state characteristics of Florida lakes. Lake and Reservoir Management 4:21-31.
Reference ID: 403
Keywords: KCOL/Brad Jones

____. 1988. Regional geology and the chemical and trophic state characteristics of Florida lakes. Lake and Reservoir Management 4:21-32.
Reference ID: 601
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Canfield, D. E., Jr., M. V. Hoyer, and C. M. Duarte. 1990. An emperical method for characterizing standing crops of aquatic vegetation. Journal of Aquatic Plant Management 28:64-69.
Reference ID: 568
Keywords: Vegetation
Abstract: Data from 55 Florida lakes were used to demonstrate that the maximum measured standing crop of emergent, floating-leaved, and submersed plants can be used to provide a simple characterization of macrophyte standing crops in the littoral zones of lakes. The maximum standing crop was strongly related to the mean standing crop of emergent, floating-leaved, and submersed macrophytes, and there was also a strong relationship when data from all plant types were combined. The analyses suggest that the maximum standing crop of aquatic macrophytes can provide useful information to characterize macrophyte standing crop in the littoral zone of lakes.

Canfield, D. E., Jr., K. A. Langeland, M. J. Maceina, W. T. Haller, J. V. Shireman, and J. R. Jones. 1983. Trophic state classification of lakes with aquatic macrophytes. Canadian Journal of Fisheries and Aquatic Sciences 40:1713-1718.
Reference ID: 405
Keywords: KCOL/Brad Jones/Vegetation

Canfield, D. E., Jr., J. V. Shireman, D. E. Colle, W. T. Haller, C. E. Watkins II, and M. J. Maceina. 1984. Prediction of chlorophyll *a* concentrations in Florida lakes: Importance of aquatic macrophytes. Canadian Journal of Fisheries and Aquatic Sciences 41:497-501.
Reference ID: 406
Keywords: KCOL/Brad Jones/Vegetation

Canfield, S. L., and D. E. Canfield, Jr. 1994. The TEAM Approach ó "Together for Environmental Assessment and Management." A process for developing effective lake managment plans or water resource policy. Lake and Reservoir Management 10:203-212.
Reference ID: 407
Keywords: KCOL/Brad Jones

Capers, R. S. 2003. Six years of submerged plant community dynamics in a freshwater tidal wetland. Freshwater Biology 48:1640-1651.
Reference ID: 635
Keywords: Vegetation/SB/Plant succession/Species richness/Community structure/Species diversity/Modelling
Notes: Recorded by Brent Anderson 6/02/2005

Carlson, R. E., and K. E. Havens. 2005. Simple graphical methods for the interpretation of relationships between trophic state variables. Lake and Reservoir Management 21:107-118.
Reference ID: 625
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Carriker, N. E., W. T. Gillespie, and P. L. Brezonik. 1976. Boron and arsenic studies in Florida waters. Publication No. 34. University of Florida, Department of Environmental Engineering Sciences, Gainesville, Florida, USA.

Cental and Souhern Florida Flood Control District. 1975. Lake Okeechobee-Kissimmee Basin water quality information. Cental and Southern Florida Flood Control District, West Palm Beach, Florida, USA.
Reference ID: 310
Keywords: Lake Okeechobee/Kissimmee Basin/ Water quality/Lake/Brad Jones/KCOL
Notes: Brent Anderson

____. 1975. Lake Okeechobee-Kissimmee Basin water quality information. Cental and Southern Florida Flood Control District, Fort Pierce, Florida, USA.
Reference ID: 311
Keywords: Lake Okeechobee/Kissimmee Basin/ Water quality/Lake/Brad Jones/KCOL
Notes: Brent Anderson

Central and South Florida Flood Control District. 1975. Report to the governing board on regulatory levels for the lakes of the Upper Kissimmee. Central and South Florida Flood Control District, Resource Planning Department, West Palm Breach, Florida, USA.
Reference ID: 477
Keywords: KCOL/Chris Carlson
Notes: Recorded by Brent Anderson 4/24/2005

Chamberlain, E. B., Jr. 1960. Florida waterfowl populations, habitat and management. Technical Bulletin No. 7.

Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Champeau, T. R., and J. B. Furse. 2003. Littoral zone restoration of lake Istokpoga: Enhancing aquatic habitat, flood control, and water quality. Proceedings of the 11th Annual Spring Meeting of the Southern Division of the American Fisheries Society.
Reference ID: 536
Keywords: Lake Istokpoga/Vegetation

Chen, X., and Y. P. Sheng. 2003. Modeling phosphorus dynamics in a shallow lake during an episodic event. Lake and Reservoir Management 19:323-340.
Reference ID: 618
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Chesnut, T. L. 1974. Aquatic vascular plants of Lake Apopka, Florida. Florida Scientist 37:60-64.
Reference ID: 525
Keywords: Lake Apopka/Vegetation

Clarke, R. a., C. D. Stanley, B. W. MacLeod, and B. L. McNeal. 1997. Relationship of seasonal water quality to chlorophyll a concentration in Lake Manatee, Florida. Lake and Reservoir Management 13:253-258.
Reference ID: 576
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Clugston, J. P. 1963. Lake Apopka, Florida, A changing lake and its vegetation. Quarterly Journal of the Florida Academy of Sciences 26:168-174.
Reference ID: 526
Keywords: Lake Apopka/Vegetation

Comp, G. S., and L. T. Crisman. 1979. Factors affecting the vertical migration of zooplankton in Lake Conway, Orlando Florida, USA. Florida Internation University, Miami, Florida, USA.
Reference ID: 99
Keywords: Vertical migration/Zooplankton/Lake Conway/Lake/Kissimmee Basin/Surface water/Water quality/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
Diel migration patterns of zooplankton were investigated between December, 77 and November, 78.

Study Conclusions
Upward migration began at sunset and continued through midnight, when zooplankton were evenly distributed throughout the water column. Vertical migration was most pronounced during periods of lake stratification. Migration appeared confined to water temperature, dissolved oxygen, degree of stratification and food particle size and density.

Additional Comments
Samples were collected monthly at one meter depth intervals, seven times in a 24 hour period. No data was reported.

Connell Associates, Inc. 1974. Final Report for water quality modeling study of the Kissimmee River Basin. Connell Associates, Inc., Place of publication unknown.
Reference ID: 100
Keywords: Water quality/Kissimmee River Basin/Model/Brad Jones/KCOL
Notes: Brent Anderson **(Place of Publication unknown)**

Conrow, R., and J. Stenberg. 1994. Survival and competitive abilities of wetland species in the Lake Apopka

demonstration marsh project. Lake and Reservoir Management 9:65-66.

Reference ID: 539

Keywords: Lake Apopka/Vegetation/Wetland

Abstract: The Lake Apopka Marsh Demonstration Project a 525-acre constructed wetland site on the NW shore of Lake Apopka, Florida is a test for a full-scale, 5000-acre project designed to annually filter twice the volume of Lake Apopka through a shallow marsh. A program to sample the colonization of vegetation was established to determine the ability of small planted "islands" to thrive and withstand encroachment by invasive species such as cattail Typha spp. To assess development of the naturally occurring vegetation, nine transects were monitored semi-annually. Monitoring began shortly after initial flooding in October 1990. In 1991, each of three 5-acre blocks were planted in monotypic or mixed plots with 11 native wetland species. A series of plots were either seeded or mulched with soil from a donor wetland, and other control plots were left untreated. The plots were regularly sampled to assess plant community development. The total number of species in the transects fell from 64 in the 1990 survey to 38 in 1993. Cattail has increased coverage in the marsh. The three 5-acre planted blocks differed from each other in the number of species found and the amount of cattail encroachment. Changes in water depths, distance from then inflow, and prior land use may be some of the influencing factors. Planting success or failure for each particular species was similar among the blocks. In the three years to date, most planted species maintained their community integrity against the invasion of cattail or any other species. At each site, planted species have migrated past their original borders. Plots containing sawgrass Cladium jamaicensis did not survive and were replanted with Juncus effusus. Maidencane Panicum hemitomon plots had poor survival. Spikerush Eleocharis interstincta and giant bulrush Scirpus californicus were most able to invade neighboring sites.

Cooper, D. C. 1981. Planning for the management of hazardous wastes. Florida Scientist 44:129-136.

Reference ID: 101

Keywords: Hazardous waste/Management/Kissimmee Basin/River/Lead/Orange County/Osceola County/Water quality/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study

Elements of a hazardous waste management program.

Study Conclusions

Wastes of most concern in the eastern central Florida region are heavy metals (Cr, Pb) and stable organics such as pesticides. All large industries surveyed practice on-site retention. Many of the smaller industries discharge to STP's most of the time accompanied by prior treatment.

Coops, H., and S. H. Hosper. 2002. Water-level management as a tool for the restoration of shallow lakes in the Netherlands. Lake and Reservoir Management 18:293-298.

Reference ID: 606

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Coveney, M. F., E. F. Lowe, and L. E. Battoe. 2001. Perfomance of a recirculating wetland filter designed to remove particulate phosphorus for restoration of Lake Apopka (Florida, USA). Water Science and Technology 44:131-136.

Reference ID: 520

Keywords: Lake Apopka/Phosphorus assimilation/Wetland
Abstract: Operation of a 14-km(2) wetland filter for removal of total phosphorus (TP) from lake water is part of the restoration program for hypereutrophic Lake Apopka, Florida. This system differs from most treatment wetlands because 1) water is recirculated back to the lake, and 2) the goal is removal of particulate phosphorus (P), the dominant form of P in Lake Apopka. The operational plan for the wetland is maximization of the rate rather than the efficiency of P removal. The St. Johns River Water Management District operated a 2-km(2) pilot-scale wetland to examine the capacity of a wetland system to remove suspended solids and particulate nutrients from Lake Apopka. TP in the inflow from Lake Apopka ranged from about 0.12 to 0.23 mg l(-1), and hydraulic loading rate (HLR) varied from 6.5 to 42 m yr(-1). The performance of the pilot-scale wetland supported earlier predictions. Mass removal efficiencies for TP varied between about 30% and 67%. A first-order, area-based model indicated a rate constant for TP removal of 55 m yr(-1). We compared actual removal of P with model predictions and used modeled performance to examine optimal operational conditions. Correspondence between observed and modeled outflow TP was not good with constant variable values. Monte Carlo techniques used to introduce realistic stochastic variability improved the fit. The model was used to project a maximal rate of P removal of about 4 g P m(-2) yr(-1) at P loading 10-15 g P m(-2) yr(-1) (HLR 60-90 m yr(-1)). Data from the pilot wetland indicated that actual rates of P removal may prove to be higher. Further operation of the wetland at high hydraulic and P loading rates is necessary to verify or modify the application of the model.

Coveney, M. F., D. L. Stites, E. F. Lowe, and L. E. Battoe. 1994. Nutrient removal in the Lake Apopka marsh flow-way demonstration project. Lake and Reservoir Management 9:66.

Reference ID: 557

Keywords: Lake Apopka/Phosphorus assimilation/Wetland
Abstract: Model results predict that exportation of phosphorus via wetland filtration will greatly accelerate the recovery of hypereutrophic Lake Apopka. The SJRWMD operated a demonstration project where lake water was pumped in series through south (0.73 km super(2)) and north (1.4 km super(2)) wetland cells. Water flow varied from 0.4 to 1.0 m super(3)/s, and typical water depths ranged from 0.35 to 0.75 m. Theoretical hydraulic residence time in each cell varied between 4 and 12 d. More than 90% of particulate matter and 30% to 40% of TN was removed in the first cell. Phosphorus was released from the oxidized, organic soils after initial flooding, but P removal efficiency in the south cell subsequently reached 30% to 50%. With time, increased density of vegetation, accretion of flocculent sediment, and remnant agricultural ditches increased channelization of flow, and both retention times and nutrient removal rates decreased. During 29 months of operation under varying conditions, about 3.2 x 10 super(9) g dry matter, 3.6 x 10 super(6) g P, and 9.3 x 10 super(7) g N were removed from lake water in the south cell. Sediment accreted to a median depth of 33 cm, and drawdown is being tested to consolidate the newly deposited sediment and to permit herbicide treatment and burning to remove litter and to thin vegetation.

Coveney, M. F., D. L. Stites, E. F. Lowe, L. E. Battoe, and R. Conrow. 2002. Nutrient removal from eutrophic lake water by wetland filtration. Ecological Engineering 19:141-159.

Reference ID: 521

Keywords: Lake Apopka/Phosphorus assimilation/Wetland

Abstract: Lake Apopka is a large (125 km(2)). shallow (mean depth 1.6 m) lake in Florida. USA. The lake was made hypereutrophic by phosphorus loading from floodplain farms and has high levels of nutrients, phytoplankton (Ch1 a 80 mug l(-1)), and suspended matter. The restoration plan developed by the St. Johns River Water Management District encompasses the biomanipulation concept in which the critical step for large shallow lakes is increasing the transparency of the water to allow the re-establishment of submerged macrophytes. Restoration includes operation of a treatment wetland, reduction in external P loading, harvest of fish, fluctuation of lake levels. and littoral planting. The District constructed a 2-km(2) pilot-scale treatment wetland to test nutrient-removal and hydraulic performance, Lake water was recirculated for 29 months. and the removal of suspended solids and particle-bound nutrients was assessed. Hydraulic loading rate varied from 6.5 to 65 m year(-1) with a mean hydraulic residence time of about 7 days. The inflow contained 40-180 mg l(-1) TSS, 80-380 mug l(-1) TP (mostly particulate organic). and 3-9 mg l(-1) TN (mostly dissolved and particulate organic). Overall, particulate matter was removed (> 90% by the wetland, and soluble organic compounds were unaffected. Soluble inorganic compounds such as nitrate, ammonia, and soluble reactive phosphate (SRP) were low in the lake water but increased during passage through the wetland. Particulate matter at the outlet was enriched in both N (2-fold) and P (5-fold) compared to particles in the inflow. Mass removal efficiencies were 89-99 (TSS), 30-67 (TP), and 30-52% (TN), but efficiency fell when hydraulic short-circuiting occurred. First-order removal coefficients were 107 (TSS), 63 m year(-1) (TP) and 98 m year(-1) (particulate N). Areal particulate removal rates were 5.4 g dry matter m(-2) day(-1), 0.18 g PON m(-2) day(-1), and 0.006 g POP m(-2) day(-1). The ratio of N:P removal was 28:1. Total sedimentation rate was 0.4 mm day(-1) of very light matter 4.4 g dw l(-1)). About 40% of the dry matter and nitrogen removed and about 80% of the phosphorus was found in the new sediments. Relative to the inflow of lake water, evapotranspiration (4.3%), seepage (2.6%). and rainfall (2.8%) were low. Major problems were initial leaching of SRP. but not ammonia, from native organic soils and vegetation when this former farmland was flooded hydraulic short-circuiting via former drainage ditches: and low inflows under drought conditions. After 6 months SRP release declined, and initial SRP leaching could be prevented with soil treatment. Hydraulic short-circuiting occurred only after modifications were made. Low gravity flows were augmented with pumped inflows. With these improvements P-removal should increase from the measured 0.48 to at least 3 g P m(-2) year(-1). Based on the pilot project results, the first phase of an improved 14-km(2) wetland filter has been constructed. This project should accelerate improvements in the water quality of Lake Apopka Mid. ultimately. create a new, large wildlife-rich marsh.

Crisman, L. T., R. L. Schulze, P. L. Brezonik, and S. A. Bloom. 1980. Acid Precipitation: the biotic response in Florida Lakes. Pages 296-297 in D. Drablas, and A. Tollan, editors. Proceedings of the International Conference on the Ecological Impact of Acid Precipitation. Sandefjord, Norway.

Reference ID: 103

Keywords: Lakes/Nutrients/Water Quality/Brad Jones/KCOL

Notes: Brent Anderson

Crisman, T. L., J. R. Beaver, and J. S. Bays. 1982. Examination of the relative impact of microzooplankton and macrozooplankton on bacteria in Florida lakes. Int. Ver. Theor. Angew. Limnol. Verh. 21:359-362.
Reference ID: 102
Keywords: Zooplankton/Bacteria/Lakes/Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Darby, P. C. 2001. The affect of habitat restoration activities on applesnail abundance in central Florida lakes. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 501
Keywords: Applesnail/KCOL/Agustin Valido
Notes: Recorded by Brent Anderson 5/23/2005

Darby, P. C., P. Valentine-Darby, and H. F. Percival. 1998. Assessing the impact of the Lake Kissimmee restoration on apple snails. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 502
Keywords: KCOL/Applesnail/lake Kissimmee/Agustin Valido
Notes: Recorded by Brent Anderson 5/23/2005

Davis, F. E., and M. L. Marshall. 1975. Chemical and biological investigations of Lake Okeechobee, Florida, USA, January 1973- June 1974. Technical Report 75-1. Centeral and Southern Florida Flood Control District, West Palm Beach, Florida, USA.

Davis, S. M. 1981. Mineral flux in the Boney Marsh, Kissimmee River, Florida, USA. Mineral retention in relation to overland flow during the three year period following reflooding. Technical Publication No. 81-1. South Florida Water Management District, West Palm Beach, Florida, USA.

____. 1979. Phosphorus retention in South Florida marshes. University of Florida, Florida Cooperative Extension Services and Institute of Food and Agricultural Sciences, Gainesville, Florida, USA.
Reference ID: 320
Keywords: Water quality/Kissimmee River/ Overland Flow/Hydrology/Surface water/Chandler Slough/Kissimmee Basin/Okeechobee County/Nutrients/Brad Jones/KCOL/Phosphorus assimilation
Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study
Report presented estimates of annual phosphorous retention by 3 marshes in Florida.

Study Conclusions
Mean P concentration of inflow water ranged from 0.032mg/l (Chandler Slough). Annual P load varied from 196 Kg in Boney to 40,811 Kg in CA2a. These marshes retained from 11% to 94% of P inflows. In spite of major differences among the three marshes with respect to plant communities, physical characteristics and p inflows, the annual P retention in terms of Kg P/ha of marsh were similar- 3.0-4.21 Kg/ha/yr. Chandler Slough demonstrated large P loss with first flash, and Boney Marsh did not.

Dawkins and Associates. 1977. Preliminary Orlando easterly water quality modeling study. Dawkins and Associates, Orlando, Florida, USA.
Reference ID: 106
Keywords: Water quality/Water quality modeling/Modeling/Orlando/Brad Jones/KCOL
Notes: Brent Anderson

Dickson, K. G., A. C. Federico, and J. R. Lutz. 1978. Water quality in the Everglades Agricultural Area and its impact on Lake Okeechobee, Florida, USA. Technical Publication No. 78-3. South Florida Water Management District, West Palm Beach, Florida, USA.

Dickson, K. 1980. The South Florida water quality monitoring network. Annual report. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Dierberg, F. E. 1993. Decomposition of desiccated submersed aquatic vegetation and bioavailability of released phosphorus. Lake and Reservoir Management 8:31-36.

Reference ID: 594

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Dierberg, F. E., V. P. Williams, and W. H. Schneider. 1988. Evaluating water quality effects of lake management in Florida. Lake and Reservoir Management 4:101-112.

Reference ID: 600

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Diveen, J. W., R. L. Goodrick, D. W. Hallett, and J. F. Milleson. 1974 . The Kissimmee River revisited. In depth report 2. Central and Southern Florida Flood Control District, West Palm Beach, Florida, USA.

Reference ID: 109

Keywords: Kissimmee River/Flood control/Kissimmee Basin/Water quality/Nutrients/Glades County/Highlands County /Okeechobee County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/22/2005

Brief Description of Study

Report covers historical ecology, beginnings of C-38, present condition ecological studies, experimental reflooding, Fishes, vegetation, water chemistry, marsh nutrients, pesticides, and conclusion.

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Study Conclusions

Research by FCD shows P levels in Lake Tohopekaliga are greater than 300ppb OPO_4, while P content in the water entering the Kissimmee River has been reduced to <5 ppb. The FCD-USGS Coop Program indicated that nutrient loading increased downstream in C-38. During the 1973 wet season the nutrient content on the major tributaries was determined and it indicated that ortho-P is greatest in tributaries entering pools C, D and E.

Additional Comments

Ortho-P concentration figure is the only data presented in this report. No raw data.

Dobberfuhl, D. R. 2003. Cylindrospermopsis raciborskii in three Central Florida Lakes: Population dynamics, controls, and management implications. Lake and Reservoir Management 19:341-348.

Reference ID: 619

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Dodds, W. K. 2003. The role of periphyton in phosphorus retention in shallow freshwater aquatic systems. Journal of Phycology 39:840-849.

Reference ID: 519

Keywords: Periphyton/General

Abstract: Eutrophication caused by phosphorus (P) leads to water quality problems in aquatic systems, particularly freshwaters, worldwide. Processing of nutrients in shallow habitats removes P from water naturally and periphyton influences P removal from the water column in flowing waters and wetlands. Periphyton plays several roles in removing P from the water column, including P uptake and deposition, filtering particulate P from the water, and attenuating flow, which decreases advective transport of particulate and dissolved P from sediments. Furthermore, periphyton photosynthesis locally increases pH by up to 1 unit, which can lead to increased precipitation of calcium phosphate, concurrent deposition of carbonate-phosphate complexes, and long-term burial of P. Actively photosynthesizing periphyton can cause super-saturated O-2 concentrations near

the sediment surface encouraging deposition of metal phosphates. However, anoxia associated with periphyton respiration at night may offset this effect. Linking the small-scale functional role of periphyton to ecosystem-level P retention will require more detailed studies in a variety of ecosystems or large mesocosms. A case study from the Everglades illustrates the importance of considering the role of periphyton in P removal from wetlands. In general, periphyton tends to increase P retention and deposition. In pilot-scale constructed periphyton-dominated wetlands in South Florida, about half of the inflowing total P was removed.

Duchrow, R. M., and C. C. Starling. 1972. Annual progress report- water quality investigations. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.

Reference ID: 112

Keywords: Water quality/Nutrients/Water quality/Crooked Lake/Lake Istokpoga/Highlands County/Lake Jackson/Osceola County/Lake June in Winter/Lake Kissimmee /Lake Okeechobee/Pierce Lake/Polk County/Reedy Lake/Orange County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/23/2005

Study Conclusions

The author found eutrophic indicators to rank lakes. He found his method to be similar to the ranking of the same 14 lakes in Brezeniks statewide survey using modeling.

Additional Comments

The report contains semi-annual data collection, and tabularized ranking of data. Raw data for each lake has been tabularized. Phytoplankton data is also available

Duchrow, R. M. 1970. Annual progress report for investigations project-water quality study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.

Reference ID: 110

Keywords: Water quality/Kissimmee Basin/ Istokpoga Basin/Crooked Lake/Lake Istokpoga/Highlands County/Lake Jackson/Osceola County/Lake June in Winter/Lake Kissimmee/Lake Okeechobee/Pierce Lake/Polk County/Reedy Lake/Orange County/Surface water/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/23/2005

Study Conclusions

The author suggests that the measurement of particulate organic N offers a fairly simple and accurate method of estimating algal densities. However, no supportive information was given. Information was based on some correlation stats between chl a, turbidity and particulate organic N.

Additional Comments

Methods include semi annual sampling at a single-mid lake station. Data tabularized.

____. 1971. Annual progress report for investigations project- water quality study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.

Reference ID: 111

Keywords: Water quality/Kissimmee Basin/ Istokpoga Basin/Surface water/Nutrients/Butler Lake/East Lake Tohopekaliga/Marion Lake/Red Beach Lake/Rosalie Lake/Star Lake/Tibet Lake/Lake Tohopekaliga/Underhill Lake/Wales Lake/Osceola County/Orange County/Polk County/Highlands County/Nutrients/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/22/2005

Study Conclusions

Found the least eutrophic lakes to be those mostly unaffected by man.

Additional Comments
Data tabularized. All lakes were ranked according to turbidity, chl a, PON.

Dudiak, T. A. 2003. The sounds of silence: Trends in the regulation of personal watercraft. Lake and Reservoir Management 19:45-54.
Reference ID: 611
Keywords: Brad Jones/Water quality/Personal watercraft/Boating regulations/Boating ordinances/Surface use management
Notes: Recorded by Brent Anderson 6/02/2005
Abstract: In recent years, U.S. courts have upheld arguably objectionable local ordinances that single out particular kinds of vessels such as the personal watercraft. Communities across the country have grown bolder in recent years as congestion on U.S. waters increases and state enabling legislation becomes more specific in terms of the watercraft to be regulated, the zoning tools to be employed and the objectives to be achieved. Standard police power objectives, which form the basis for boating regulations, are now articulated not only in terms of protecting public health, safety and welfare, but in terms of protecting the environment, encouraging historical uses and preserving peace and tranquility. The purpose of this paper is to provide an overview of boating regulatory authority and watercraft specific regulations as well as discuss and offer an analysis of recent key court decisions and trends in personal watercraft regulation. Courts have been reluctant to question the judgment of local government and will uphold a regulation provided certain basic elements are present. That these local regulations have been upheld is indicative of a greater judicial responsiveness to ordinances whose primary objective is not simply public welfare and safety, but more specifically the protection of natural resources and environmental integrity.

Duever, M., J. McCollom, and L. Neuman. 1985. Plant community boundaries and water levels, Lake Hatchineha, Florida. Florida Department of Natural Resources, Tallahassee, Florida, USA.
Reference ID: 409
Keywords: Lake Hatchineha/KCOL/Brad Jones/Vegetation

Durfor, C. N., and E. Becker. 1964. Chemical quality of public water supplies of the United States and Purto Rico: Hydrologic Investigations Atlas. U.S. Department of the Interior, Geological Survey, Washington D.C., USA.
Reference ID: 313
Keywords: Purto Rico/Water quality/Glades County/Highlands County/Orange County/Osceola County/Okeechobee County/Polk County/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study
Description geared to national level determination of general levels of below constituents.

Study Conclusions
Dissolved solid range 251-500ppm
Hardness range 7180ppm
Sodium range 0-20ppm
Fluoride range 0-0.5ppm
*in raw untreated water
Additional Comments
Not known whether all quality pertains to surface water or groundwaters (wells) or a combination of both.

Dye, C. W., D. A. Jones, L. T. Ross, and J. L. Gemert. 1980. Diel variations of selected physico-chemical parameters in Lake Kissimmee, Florida, USA. Hydrobiologia 71:51-60.
Reference ID: 113
Keywords: Diel/Lake Kissimmee/Water quality/Nutrients/Brad Jones/KCOL/Vegetation
Notes: Brent Anderson
Abstract: Diel variations in physical and chemical parameters were determined in waters

from a drainage canal containing water hyacinth (floating plant), a water hyacinth pond, an elodea (submerged plant) pond, a cattail (emersed plant) pond, a pond without aquatic macrophytes (control), and eutrophic Lake Apopka , Florida. Parameters measured in the October, January, May, and July (1979-80) samplings were dissolved oxygen, pH, dissolved carbon dioxide, bicarbonate and carbonate alkalinity, ammonium-N , nitrate-N, phosphate-P and conductivity. Water in hyacinth ponds showed little or no diel or seasonal variation in dissolved oxygen, pH, dissolved carbon dioxide and bicarbonate alkalinity. In aquatic systems with no floating vegetation (elodea, cattail, control, and Lake Apoka) dissolved oxygen increased to a high of 5-20 micrograms per ml at midday and decreased to 2-8 micrograms per ml at night. The pH of the waters ranged from 8-9.5 during midday to 7-8 at night. In systems with no floating vegetation bicarbonate levels decreased during daylight and carbonate levels increased. An inverse relationship between carbonate and bicarbonate alkalinity was seen at night. No carbonates were detected in the water hyacinth ponds. No diel variations in N (ammonium and nitrate) or P (phosphate) were observed in any systems. (Cassar-FRC)

Dye, C. W., D. A. Jones, L. T. Ross, and R. L. Willmore. 1975. Limiting nutrients in the Kissimmee River-Lake Okeechobee Basin based on algal bioassay techniques. Technical Series 1(2). Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Dysart, J. E., and D. A. Goolsby. 1977. Dissolved-solids concentrations and loads in Florida surface waters. (Map). Department of the Interior, Geological Survey.

E.D Stone & Associates. 1991. Conceptual land and natural resources management plan, Kissimmee River Save Our Rivers Project. Final Report to South Florida Water Management District. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 450
Keywords: Brad Jones/KCOL

East Central Florida Regional Planning Council. 1974. Environmental Assessment of the Orange, Seminole, Osceola metropolitan water quality management study. Part II: Preliminary report. East Central Florida Regional Planning Council, Winter Park, Florida, USA.
Reference ID: 118
Keywords: Water quality/Water management/Osceola County/Seminole County/Orange County/Metropolitan/Nutrients /Non point/Pollution/Eutrophication/Nutrients/Runoff/Boggy Creek/Bonnet Creek/Reedy Creek/Shingle Creek/Lake Tohopekaliga/Kissimmee Chain of Lakes/Surface water/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study

Assessment was performed to identify direct environmental impacts of action, adverse impacts that could not be avoided upon implementation alternatives, relationships between (1) local short term (2) maintenance (3) enrichment of long term productivity and (4) irreversible and irretrievable commitments of resources which would be involved upon initiation of action. Nine alternatives received advanced waste treatment in stream discharge.

Study Conclusions

As the population of the three metro counties increases, point and non point source pollution sources may increase because more formerly undeveloped land now needed for agriculture and urban land use. Runoff caries excess nutrients, wastes, chemical and pesticides from agriculture to surface and ground water, and also grease, oil, sediments from urban land. Point (sewage) and non point (storm) volumes increase rapidly.

Such pressures have been degrading quality of metro's streams and lakes. Total P in all streams exceeded Orange County's standards. Total N levels were exceeded in at least one location in every stream. All metro lakes showed violations of P and N (P std=0.01) (N std=0.731). Coliforms averaged >1,000µg/100ml. EPA used Vollenweider method for measuring nutrients in streams in Shingle Creek. Based on nutrient analysis, no discharge of effluents could take place in Shingle Creek without degrading the less that desirable quality of Lake Tohopekaliga. Subsequent testing showed that discharge of nutrients into any stream in the metro area would eventually have a deleterious effect on one or more lakes in the metro area. Water quality in lakes in this area is influenced by groundwater quality.

Additional Comments

All lakes and wetlands in this area were considered as potential sewage disposal as well as non water areas. No raw data. Some nutrient quality review (general). D.O and nutrient standard (Orange County criteria) violations for the watersheds studied.

____. 1972. Orange-Seminole metropolitan water quality management study. Facilities inventory update, Phase I. East Central Florida Planning Council, Winter Park Florida, USA.

Reference ID: 314

Keywords: Water quality/Water management/Orange County/Metropolitan/Facilities/Brad Jones/KCOL

Notes: Brent Anderson

____. 1974. Orange-Seminole metropolitan water quality management study, Preliminary Report. East Central Florida Planning Council, Winter Park Florida, USA.

Reference ID: 119

Keywords: Water quality/Water management/Orange County/Metropolitan/Osceola County/River/Lake/Nutrients/Nutrient loading/Treatment/Sewage/Reedy Creek/Bonnet Creek/Boggy Creek/Shingle Creek/Lake Tohopekaliga/Kissimmee Basin/Mary Jane Lake/East Lake Tohopekaliga/Hart Lake/Surface water/Kissimmee Chain of Lakes/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study

The purpose of this study is to provide a practical program for the improvement of water quality and the development of staged implementation plans for both the short and long term range sewerage facility needs in the urban and urbanizing portions of the metropolitan area. Specific objectives include (1)develop and evaluate alternative wastewater treatment facilities (2) select facilities which insure high quality of treatment to developed and undeveloped areas (3) expedite the accomplishment of desirable stream standards by insuring that acceptable sewage treatment and effluent disposal methods are utilized (4) evaluate non point sources and suggest appropriate action for abatement (5) financial evaluation for wastewater facilities implementation (6) determine appropriate institutional and management options necessary to implement the water quality plan (7) coordinate orderly development of public and private sewerage facilities within the metro area. The purpose of the background studies is to provide a program for the implementation of the water quality plan for both long and short range sewerage facilities in the urban and urbanizing portions of the metro area.

Study Conclusions

Analysis of existing water quality in area streams, rivers and lakes indicate most are in poor to very poor condition with respect to several critical water quality parameters and standards (D.O and Nutrients) Most streams (Boggy) had D.O.'s <4.0mg/l in one or more locations along the stream. Others showed average D.O. in lakes showed concentrations exceeding saturation level. P and N concentrations in most of the streams exceeded those recommended by Orange County Pollution Control criteria.

East Central Regional Planning Council. 1978. Orlando metropolitan areawide water quality management plan. East Central Regional Planning Council, Winter Park, Florida, USA.

Reference ID: 120

Keywords: Orlando/Metropolitan/Water quality/Water management/Kissimmee Basin/River/Kissimmee Chain of Lakes/Surface water/Orange County/Osceola County/Nutrient loading/Nutrients/Runoff/Pollution/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study
The purpose of the Orlando metro 208 plan is to provide for a water pollution control program that will effectively solve local water pollution problems.

Study Conclusions
As found in vol. 1, existing average point and non point loading demonstrate substantial increases over natural levels. Load increases represent an approximate range 0.3-20 lbs of pollutants. 20% of most urbanized sub-basins exhibit the largest increases in pollution loads and runoff flows. A majority of existing pollutant (nutrient) loadings to plan area. Waters are from non point sources Existing nutrient loads as a % of derived natural loadings a (1) BOD-point 14%, non point- 164%, (2) Total N-Point 35%, non point 172% (3)Total P-point 352, non point- 440% Phosphorous is primarily the nutrient of concern. P load concentrations increase above background is due to cultural land uses.

Echternacht, K. L. 1975. A study of the precipitation regimes of the Kissimmee River-Lake Okeechobee watershed. Technical Series 1(3). Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Ecoimpact, Inc. 1976. An analysis of cattle ranching in the Kissimmee River Basin. Ecoimpact, Inc., Gainesville, Florida, USA.
Reference ID: 122
Keywords: Kissimmee River Basin/Water quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson

Egbert, A. L. 1998. Kissimmee Chain of Lakes studies. Completion report for study I: Lake Kissimmee investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 340
Keywords: Drawdown/Nuisance/Vegetation/Electrofishing/Creel/Habitat/Laura Carnal/KCOL
Notes: Recorded by Brent Anderson 3/23/2005.

How are the data in this document applicable to the metrics we are evaluating?

Angler surveys, electrofishing data, and vegetation monitoring before and after the 1996 drawdown of L.K. are important studies for future lake management of drawdowns and nuisance veg. treatments.

What parameters were monitored?

Catch per hour, total harvest, angler effort, aerial survey counts, creel surveys, amount of muck removed, aquatic plant treatments, species composition on test plots, habitat restoration and largemouth bass recruitment, YOY estimates, and others.

What was the geographic extent of monitoring?

Lake Kissimmee

How many samples or sample locations were monitored?
Creel 5 winter, 4 summer divided into north and south lake and then in half again. One weekend day and at least one week day for the two week periods for an average of three hours.
Electrofishing eight fixed littoral sites in spring (1993 95) and spring (1997-98). Each sampled after sunset for 20 minutes. Three samples in 93-93, two samples in 97-98.
Electrofishing for age and growth study of largemouth bass was conducted in Feb and Mar 1996.
Stage data

What was the sampling frequency and duration (period of record)?
See above

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?

FWC some muck removal and other work (not data) was performed by SFWMD and USACOE.

Where are the data located? (agency or organization maintaining database)

FWC - Kissimmee

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

unknown

Are raw data and/or summarized data presented in the document?

Mostly summarized data available in this document

Is a summary of findings presented in the document?

Yes, good summaries of all components are presented.

____. 1996. Kissimmee Chain of Lakes studies. Completion report for study III: East Lake Tohopekaliga, Aligator Lake Chain investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 339

Keywords: Drawdown/East Lake Tohopekaliga/Creel/Electrofishing/Invertebrates/Water quality/Laura Carnal/KCOL

Notes: Recorded by Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?
Biomass of vegetation, relative abundance of sportfish, and water quality parameters in E. Lake Toho are direct measurements needed for performance measure development.

What parameters were monitored?

WQ parameters, plant biomass, fish biomass, littoral vegetation, grams per ha fish species. Some snail kite and invertebrate data might be useful to those metrics.

What was the geographic extent of monitoring?
East Lake Tohopekaliga, Boggy Creek, and the Alligator Chain of Lakes.

How many samples or sample locations were monitored?
Varied depending on component -

What was the sampling frequency and duration (period of record)?
WQ quarterly, 6 sites (1991-1996)
Creel two weekend and three weekdays random during a single two-week period (feb may 1994).
Electrofishing 6 sites spring (1991-1996), 15 minutes, after sunset. Four sites after much removal (1992-95) for 20 minutes, twice annually in 92 and three times annually (93-95) during daylight hours.
Veg. 7 sites, 4 control and discing sites(1989-1991), and 2 much removal sites (1989-93 and in 1`995) during Oct/Nov.

Invertebrates semi-annual littoral zone Jan 1991 July 1002
Snail kites airboat one day each month from Jan 1990 June 1996.

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
Fish and Game Commission

Where are the data located? (agency or organization maintaining database)
FWC - Kissimmee

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Certified lab for WQ, computer analytical tools for biomass etc., not sure of quality.

Are raw data and/or summarized data presented in the document?
Both, mostly summarized data

Is a summary of findings presented in the document? Yes

____. 1995. Kissimmee Chain of Lakes studies. Completion report for study IV: Lakes Cypress and Hatchinea Investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 337
Keywords: Water quality/Electrofishing/Fish densities/Hydrilla/Laura Carnal/KCOL
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?

Provides data and summaries for water quality and fish on Lakes Gentry, Russell, Hatchineha, and Cypress, and Reedy Creek for the period of 1985 1995. Also contains observations of littoral vegetation and estimates of hydrilla coverage and treatment coverage.

What parameters were monitored?

All water quality parameters for nutrients, turbidity, and chemicals. Acreage estimates of hydrilla and amount treated are also included. Weights and numbers of fish collected and mean number per hour for electrofishing are presented.

What was the geographic extent of monitoring?

Lakes Gentry, Russell, Hatchineha, and Cypress, and Reedy Creek.

How many samples or sample locations were monitored?

What was the sampling frequency and duration (period of record)?

WQ quarterly at 13 locations excluding Gentry.
Fish gill nets in spring of 87-94, spring electrofishing at three sites on each of the following lakes: Russell (1985-95), Gentry (94-95), Cypress (1988-95), and at four sites in Hatchineha (1988-95).

Do these data cover the baseline or reference (pre-1960s) period?

Baseline.

Who collected the data?

Fish and Game Commission

Where are the data located? (agency or organization maintaining database)
FWC Kissimmee ?

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Eustis Research Lab for all chemicals - ?

Are raw data and/or summarized data presented in the document?
Both

Is a summary of findings presented in the document?
Yes

Emery, R. C., C. E. Moon, and E. B. Welch. 1973. Delayed recovery in a mesotrophic lake after nutrient diversion. Journal of the Water Pollution Control Federation 45:913-925.
Reference ID: 123
Keywords: Mesotrophic/Mesotrophic lake/Nutrients/Pollution/Water quality/Recovery/Brad Jones /KCOL
Notes: Brent Anderson

Epstein, R. J. 1953. Variations of O^{18} content of waters from natural sources. Geochimica et Cosmochimica Acta 4:213-224.
Reference ID: 124
Keywords: O18/Water quality/Brad Jones/KCOL
Notes: Brent Anderson
Abstract: A number of marine water and fresh water samples were examined for the relative O^{18}/O^{16} ratio, and the variation of this ratio was determined to a precision of ± 0.1%. In the case of surface marine waters, for a range of salinity of 29.40%., the O^{16} content varies over a range of approximately 6%. The low O^{18}/O^{16} ratios were obtained from surface marine waters contaminated with meltwater from the ice fields, while the marine waters of high salinity were richest in O^{18}. The observed relation between O^{18} content and salinity of the oceanic waters can be explained by a process of multiple stage distillation which produces a continuous loss of fresh water to the ice regions from the surface waters of the warm oceans. The lower salinities of cold ocean currents, such as the Alaskan and Californian currents, are due primarily to mixing with meltwater from cold regions. The effect of glaciation upon the isotopic method of measuring paleotemperatures is discussed. The results for deep oceanic samples and for non-typical water samples are also discussed.

Ewel, K. C., and T. D. Fontaine III. 1977. Proposed relationships between white amur and the aquatic ecosystems at Lake Conway, Florida, USA. Pages 159-176 in W. E. S. U.S. Army Corps of Engineers, editor. Proceedings of the research planning conference on the aquatic plant control program. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA.
Reference ID: 125
Keywords: Lake Conway/Water quality/Nutrients/Kissimmee Basin/Orange County/Lake/Gatlin Lake/Little Lake Conway/Macrophytes/Runoff/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/23/2005

Study Conclusions

Hydrilla-the dominant macrophyte provided the greatest P input to the lake and each plant groups provides more than is made available by remineralization or rainfall and runoff. The nutrient release would actually be considerably less since the plants also derive at least some of their orthoP requirement from water.

Additional Comments

Model using general data- P, temp, and solar radiation

Ewel, K. C., and T. D. Fontaine III, University of Florida, School of Forest Resources and Conservation. 1981. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Report 2, First year poststocking results. Technical Report A-78-2. U.S. Army Corps of Engineers, Waterways Experiment Station, Jacksonville, Florida, USA.

Fan, A. 1986. A routing model for the Upper Kissimmee Chain of Lakes. Technical publication No. 86-5. South Florida Water Management District, West Palm Beach, Florida, USA.

Fan, A., and S. Lin. 1984. Water budget for Upper Kissimmee Chain of Lakes. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Federico, A. C. 1978. Environmental studies in the Chandler Slough Watershed. Technical Publication No. 78-2. South Florida Water Management District, West Palm Beach Florida, USA.

____. 1977. Investigations of the relationship between land use, rainfall, and run-off quality in the Taylor Creek watershed. Technical Publication No. 77-3. South Florida Water Management District, West Palm Beach, Florida, USA.

____. 1982. Water quality characteristics of the lower Kissimmee River Basin, Florida, USA. Technical Publication No. 82-3. South Florida Water Management District, West Palm Beach, Florida, USA.

Federico, A. C., and P. L. Bresonik. 1975. A survey of water quality in the Kissimmee-Okeechobee watershed. Technical Series 1(8). Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Federico, A. C., F. E. Davis, and J. Milleson. 1982. Nutrient retention in an unmodified flow-through marsh. Pages 181-186 in P. M. McCaffrey, T. Beemer, and S. E. Gatewood, editors. Proceedings of the progress in wetlands utilization and management symposium. Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins, Tallahassee, Florida, USA.

Reference ID: 128

Keywords: Nutrients/Nutrient retention/Wetlands/Taylor Creek/Nubbin Slough/Kissimmee River/Chandler Slough/ Cypress Slough/Okeechobee County/Ash Slough/Gore Slough/Surface water/Kissimmee Basin/Nutrient loading/Brad Jones/KCOL/ Phosphorus Assimilation

Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study

Nutrient retention capacity of a 3.8 km^2 unmodified and unregulated flow through marsh (freshwater) was evaluated using an input/output approach. This study provides information on the nutrient capability of natural marshes which can be used in comparative evaluations of the effectiveness of marsh modifications and management for the purpose of water quality improvement.

Study Conclusions

A “First flush” phenomenon was measured during the initial weeks of the wet season and was attributed to washout of decayed plant material from the previous growing season and released a net quantity of 1500 kg P and 2000 kg N of marsh, respectively. After this initial source (release) of nutrients, the marsh acted as a sink for P and alternated between sink and source for N. Over the study course, marsh showed a net retention of 11% for P and 1% for N. Chandler Slough waters are acidic with pH rarely exceeding 7.0 and averaging <6.5. Alkalinity is low (average <50mg $CaCO_3$). Dissolved solids are low as indicated by low specific conductivity. Na and Ca are major cations and are present in about equal amounts while Cl and

Carbonates are major ions. Total P concentrations are quite high and reflect intense agriculture. Gore and Ash Slough had highest P with a 2 year average of 0.4 mg/land a wet season value < 0.1 mg/l. Cypress Slough and outfall from Chandler Slough averaged 0.242mg P/l and 0.22 mg P/l respectfully, but the marsh outflow had a much lower value than the in flows. Orthophosphate =60%. All three stations had a wet season average total N level well below 2.0mg/l. Inorganic N <10% of total. During 1975 wet season, 52 %of total P, 47 % of total N and 41% of flow to Chandler Slough was from the Gore Ash Slough. During 1976, this basin supplied 57% of P, 53% of N and 47% of flow. The remainder is attributed to Cypress Slough.

Additional Comments
No raw data.

Federico, A. C., and K. G. Dickson. 1981. Lake Okeechobee water quality studies and eutrophication assessment. Technical Publication 81-2. South Florida Water Management District, West Palm Beach, Florida, USA.

Fellows, C. R., and P. L. Brezonik. 1981. Fertilizer flux into two Florida lakes via seepage. Journal of Environmental Quality 10:174-177.

Reference ID: 133

Keywords: Kissimmee Basin/Lake Conway/Water quality/Nutrients/Orange County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/23/2005
Abstract: Excessive fertilization of a 4.8-ha citrus grove with 900 kg N/ha resulted in leaching of nitrate levels into Lake Conway, Florida. A total of about 270 kg of N seeped into the lake from the single fertilization event, representing about 6% of the total applied fertilizer N, In comparison , seepage measurements at five other lake sites had much lower concentrations and fluxes of nitrate, even though three of the sites were located adjacent to fertilized agricultural or urban areas. Normal fertilization practices did not appear to enhance seepage fluxes of nutrients to lakes.

Fellows, C. R. 1978. The significance of seepage in the water and nutrient budgets of selected Florida Lakes. Ph.D. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 132
Keywords: Fertilizer/Lakes/Seepage/Pollution/Eutrophication/Kissimmee Basin/Orange County/Lake/Little Lake Conway/Lake Conway/Nutrients/Kissimmee Chain of Lakes/Nutrient loading/Groundwater /Sediments/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/23/2005

Brief Description of Study
This study measured the seepage flow and nutrient fluxes from the sediments of Florida lakes by the "seepage meter technique". Effect of rainfall on seepage rates and nutrient fluxes was examined. The role of sediments in seepage nutrient input to lakes was studied and the effect of land use on nutrient export from watersheds was considered.

Study Conclusions
Seepage meter method is a relatively consistent and site dependent. Consolidated lake sediments yielded consistent readings. Variability > in muck sediments. After a rain event, seepage recovers to near pre-rain flow rates. The contribution of seepage pulsed to lake after rain is apparently much less than surface runoff. The ratio of surface area to shoreline length appears to be an indication of the relative importance of seepage in lake water budgets. This ratio also appeared to be important in predicting the inputs of nutrients from seepage. Seepage can act as an important nutrient source to a lake apparently by flushing nutrients from mineralizing sediments. Nutrient flux via seepage is positively correlated with seepage flow and temperature. Concentrations of TIN and total P in seepage increased with increasing distance from shore. Only NO_3 and NO_2 were sufficiently mobile in the soil to reach the lake during the 229 day observation period. Nutrient loadings from seepage were relatively more important for Lake Conway than Lake Apopka. Lake Conway received 17.5 % and 10.9% of its total N and P inputs, respectively, from seepage. If the majority of seepage nutrients are derived from sediment mineralization as indicate by the study, an appreciable underestimation would have resulted by calculating seepage nutrient flux using groundwater nutrient concentrations.

Additional Comments

The report contains mostly qroundwater seepage quantities and qualities. Nutrient loads and recommendations for further study.

Fisher, M. M., K. R. Reddy, and R. T. James. 2001. Long-term changes in the sediment chemistry of a large shallow subtropical lake. Lake and Reservoir Management 17:217-232.

Reference ID: 603

Keywords: Brad Jones/Water quality/Phosphorus/Internal load/Eutrophication

Notes: Recorded by Brent Anderson 6/02/2005

Abstract: Nitrogen (N) and phosphorus (P) content and selected physico-chemical properties of Lake Okeechobee sediments were measured in 1988 and 1998. Based on these measurements, sediments were classified as mud, littoral, peat, sand or rock. Although some minor redistribution has occurred over the previous decade, mud sediments of Lake Okeechobee essentially occupy the same total area. Total surface sediment N and P showed little overall change in the ten-year period. However, lake-wide spatial patterns indicate some localized decreases of total P content in the littoral and northern regions of the lake. Porewater dissolved reactive P showed significant increases at most sites, suggesting that the surface sediments are losing their ability to absorb soluble P. Nutrient management practices in the drainage basin did not lead to decreased levels of N and P in the sediments of the lake.

Florida Coastal Engineers, Inc. 1975. An investigation of potential Kissimmee River marsh water quality benefits. Florida Coastal Engineers, Jacksonville, Florida, USA.

Reference ID: 134

Keywords: Water quality/Kissimmee River/ Wetlands/Lake Okeechobee /Istokpoga Basin/Highlands County/Nutrients/Boney Marsh/River Kissimmee River/Surface water/Wetlands/Nutrient loading/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

This report is part of the special project to prevent the eutrophication of Lake Okeechobee. The general objectives of this study were to (1) quantitatively evaluate the water quality benefits derived from a restored Kissimmee River marsh system as they relate to the transport of nutrients and organic matter by the River, and (2) provide the Division of State planning with recommendations for mash restoration and management to achieve these water quality benefits. A mathematical model examined the effects of an active Kissimmee River marsh system on the transport and release of nutrients and organic material and coliform bacteria.

Study Conclusions

Results show that a restored Kissimmee River marsh system would have a demonstrative significant effect on the quality of water exiting C-38 into Lake Okeechobee. The manner in which flow is introduced to a marsh as a point or non point source load will affect the amount of constituents exported from the marsh relative to that entering the marsh by an amount $\leq$ 7%. Deeper mean flow depths on the marsh resulted in proportionately lower amounts of constituent exported from the marsh relative to those entering the marsh for flows having the same V/Q ratio. Decreases in the mean wet season flow depth below a value of 2 feet result in a significant reduction of the water quality benefits available from an active marsh system. Dissolved P and C and coliform bacteria loads introduced to Lake Okeechobee by the Kissimmee River would be significantly reduced by an active marsh system in C-38. A decrease of 90% in the dissolved P load is estimated for average wet season flows. Detrital C and P loads introduced to Lake Okeechobee by the Kissimmee River would be significantly increased by 500% for average wet season flows. Total P load to Lake Okeechobee by the Kissimmee River would be decreased by an amount depending upon the distribution of the dissolved and detrital forms of P entering the marsh from the uplands. Existing data indicate that 90% of the P load introduced to Lake Okeechobee by the Kissimmee River is estimated for the marsh restoration scheme presented in the report. Of the reduced load entering Lake Okeechobee it is estimated 84% would be attributed to detrital P and 16% to dissolved P.

Florida Department of Administration. 1976. Final Report on the management plans of the special project to prevent the eutrophication of Lake Okeechobee. Florida Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, Tallahassee, Florida, USA.

Reference ID: 137

Keywords: Eutrophication/Lake Okeechobee/ Pollution/NutrientsNutrient loading/Kissimmee Basin/Istokpoga Basin/Glades County/Highlands County/Orange County/Osceola County/Okeechobee County/Polk County/Surface water/Water quality/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

The special project to prevent the eutrophication of Lake Okeechobee has studied the water problems of the region for the last three years and has again reaffirmed the importance of water conservation and water quality protection. The project found Lake Okeechobee to be eutrophic and emphasizes the need to protect the lake as virtually the entire region south of the lake depends on it in times of water supply.

Study Conclusions

Large nutrient loads enter the lake as a result of drainage and land use practices in the lakes watershed. Changes in the lakes drainage basins have caused rain water to run off the land rapidly, transporting nutrients dissolved from cattle waste in the northern basins and nutrients released by the subsidence of the organic soil in the EAA to Lake Okeechobee. These nutrients cause eutrophication on the lake and the rapid runoff water also fails to provide all of the vital life-giving service needed by agriculture and fish and wildlife.

Additional Comments

Report includes loading data on Lake Okeechobee and its major inflows and special mention of loads and information on Taylor Creek/Nubbin Slough basin, upper and lower Kissimmee Basin (nutrient loads and sources) and Lake Istokpoga/Indian Prairie, Fisheating Creek basins. Summaries of project research is also included.

____. 1976. Final Report on the management plans of the special project to prevent the eutrophication of Lake Okeechobee (Draft). Florida Department of Administration,Division of State Planning, Bureau of Comprehensive planning, Tallahassee, Florida, USA.

Reference ID: 475

Keywords: Eutrophication/Lake Okeechobee/ Pollution/NutrientsNutrient loading/Kissimmee Basin/Istokpoga Basin/Glades County/Highlands County/Orange County/Osceola County/Okeechobee County/Polk County/Surface water/Water quality/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

The special project is responsible for preventing the eutrophication of Lake Okeechobee which is primarily a water quality problem. However, the nature of the water cycle in South Florida is such that water quality considerations necessarily encompass water conservation and land use problems as well. The report introduction reflects on a historical perspective, South Florida's natural water management system, effects of drainage in South Florida, State Governments move to confront the problem and a history of the special project to prevent the eutrophication of Lake Okeechobee. This preceded a summary of management Plans to prevent the eutrophication of Lake Okeechobee including the EAA, Taylor Creek, Nubbin Slough, Lower and Upper Kissimmee Valley, Istokpoga, Indian Prairie Basins, and Fisheating Creek Basin. Canalization by Corps, the Soil and Water Conservation Service and private interests along with extensive upland drainage and urban and agricultural development in South Florida has resulted in (1) the loss of high quality surface water throughout the basin (Lake Okeechobee), (2) water quality in some areas that is badly degraded, and (3) the loss of the ability of the region to conserve fresh water.

Cattle wastes are a major source of nutrients entering Lake Okeechobee from Taylor Creek-Nubbin Slough Basin (preliminary analysis), and these wastes contribute significantly to Lake Okeechobee eutrophication. The Basin contributes 213 tons of P and 561 tons of N annually to Lake Okeechobee. Research shows conclusively that ditch improved pastures generate large P loads, especially in conjunction with high cattle stocking and overflow effluent from dairy lagoons. Because of canalization and upland drainage, large

nutrient loads are transported rapidly to Lake Okeechobee without significant water quality treatment. Primary source of high P loads are from (1) dairy barns and (2) concentrating areas (3) intensive cropland areas (4) beef cattle production on semi-improved and natural range.

____. 1976. Findings and recommendations from the special project to prevent the eutrophication of Lake Okeechobee (Draft). Florida Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, Tallahassee, Florida, USA.

Reference ID: 138

Keywords: Eutrophication/Lake Okeechobee/ Kissimmee Basin/Istokpoga Basin/Kissimmee Chain of Lakes/Surface water/Runoff/Pollution/Nutrient loading/Nutrients/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

The report summarizes the draft findings and recommendations of the special project to prevent the eutrtophication of Lake Okeechobee. The purpose of the project was to derive an effective land and water management plan that, when implemented, would prevent the further cultural eutrophication of Lake Okeechobee. Intensive studies have been made of Lake Okeechobee, water and nutrients entering the lake, and related land use and drainage practices in each of the lakes drainage basins. Methods of studying included water quality and quantity analysis, load use, computer modeling, and other studies.

Study Conclusions

General findings require attention be focused on several major problems including (1) private drainage and land use practices throughout the basin (2) sewage loadings to the Kissimmee Upper Chain of Lakes (3) Backpumping from EAA (4) water retention in the Kissimmee valley and other Lake Okeechobee tributaries (5) practice of destruction and drainage of wetlands.

____. 1975. Interim Report of the special project to prevent the eutrophication of Lake Okeechobee. Florida Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, Tallahassee, Florida, USA.

Reference ID: 136

Keywords: Eutrophication/Lake Okeechobee/ Pollution/Nutrients/Nutrient loading/Kissimmee Basin/Istokpoga Basin/Surface water/C-38/Taylor Creek/Nubbin Slough/Fisheating Creek/S-65C/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

The ultimate purpose of the project is to understand the Lake Okeechobee ecosystem sufficiently to decide a land and water management plan which, when implemented, will prevent further cultural eutrophication of the lake. To that end it is necessary to analyze not only the lake as an ecological entity, but also the regional ecosystem of which Lake Okeechobee forms a dominant part.

Study Conclusions

Nutrient concentrations of the Kissimmee River inflows are < than the concentrations of any other inflow except rainfall. The percent of fisheating Creek and Kissimmee River's contributions of total nutrient loads closely related to water flow contributions. The contribution of P from Taylor Creek-Nubbin Slough is disproportionately high in relation to its flow contribution being $\geq$ than that from Kissimmee River with only 10-20% of its flow. High P concentrations and loads are found in areas used intensively for dairy and next highest for pasture. Highest N concentrations and loads derive from much land area devoted raw crops and cane. Average concentration of total P and total N are considered high along the entire length of C-38, especially below S-65C where average concentrations approach those values normally associated with impounded waters susceptible to eutrophication. Total P concentrations are relatively consistent above S-65C, but were not between S-65C and Lake Okeechobee. Total N levels remained relatively constant throughout the entire canal length. Organics do not seem high. Shingle Creek and Boggy Creek receive 68% of the sewage effluent released to surface water in the upper basin. The report quoted nutrient loads for Taylor Creek-Nubbin Slough, and Fisheating Creek from previous reports by Marshall and Davis, 1975, Joyner, 1973 and 74, Odum, 1953.

____. 1975. A summary of the Interim Report of the special project to prevent the eutrophication of Lake Okeechobee. Florida Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, Tallahassee, Florida, USA.

Reference ID: 135

Keywords: Lake Okeechobee/Kissimmee Basin/ Istokpoga Basin/Polk County/Osceola County/Orange County/Okeechobee County/Highlands County/Glades County/Nutrients/Water Quality/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

The purpose of this project is to decide an effective land and water management plan that, when implemented, will prevent the further cultural eutrophication of Lake Okeechobee.

Study Conclusions

The major causative factors of the present cultural eutrophication of Lake Okeechobee are (1) canalization of the tributary rivers and streams (2) backpumping of highly enriched waters from the agricultural area (3) upland drainage practices in the watershed (4) inadequate nutrient conservation, livestock management and other agricultural practices in the watershed and (5) management and regulation of water levels of the lake and its tributaries which diminishes their ability to absorb nutrients.

Additional Comments

The report generally contains conclusions and some nutrient % contribution to Lake Okeechobee. No raw data or specific loads reported.

Florida Department of Environmental Protection. 2004. Water quality status report: Kissimmee River and Fisheating Creek. Florida Department of Environmental Protection, Division of Water Resource Management, Tallahassee, Florida, USA.

Reference ID: 413

Keywords: KCOL/Brad Jones

Florida Department of Environmental Regulation. Date unknown. Agricultural nonpoint source ellement of the state water quality management plan. Draft. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Reference ID: 139

Keywords: Water quality/Kissimmee Basin/ Istokpoga Basin/Nutrients/Osceola County/Orange County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005 **(date unknown)**

Brief Description of Study

Purpose of this element is to identify those watersheds having known a potential non point pollution source stemming from certain agricultural land use practices.

Additional Comments

Contains general agricultural NPS statewide assessment, Informative and could be useful but doesn't specifically deal with area-Does have fertilizer and pesticide use for Orange and Osceola County (no specific resources in area).

____. 1981. Inventory of Florida water quality monitoring stations. First Edition. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Reference ID: 144

Keywords: Kissimmee Chain of Lakes/Kissimmee Basin/Istokpoga Basin/Water quality/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

Organized the information of various water quality monitoring programs carried out by the state, local and

federal agencies.

Additional Comments
A list of cooperating agencies is available, type of data collected and station location.

____. 1976. Kissimmee River Basin water quality management plan. Preliminary report. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.
Reference ID: 140
Keywords: Kissimmee River/Water quality/Water management/Kissimmee Basin/Istokpoga Basin/Kissimmee Chain of Lakes/Polk County/Highlands County /Orange County/Osceola County/Okeechobee County/Surface water/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study
The basin plan is a response to environmental needs to provide the foundation for an initial and continuing strategy for the preservation and enhancement of the quality of water resources within the basin. The plan is a management document to identify water quality problems and remedy for the entire basin. Specific objectives included establishment of a continuing process, identify problems, coordinate planning activities, identify additional planning needs, assess other needs and priorities, schedule actions, determine research and investigative needs, and public participation.

Study Conclusions
The Kissimmee River Basin was divided into 9 segments. The water quality of 195 streams, canals, and lakes was summarized and evaluated. Available information is very limited, both in quality and quantity; biological data is almost non existent. The most frequently measured water quality problem in Basin 26 (Kissimmee River Basin and Istokpoga Basin) are high nutrients, coliforms bacteria and low D.O. levels. In north portion of the basin, primary cause of water quality problems are runoff from developed areas and discharge of treated wastes. In other regions, the main source is runoff from dairy and cattle operations and drainage of farm and marshy areas.

Additional Comments
Data is summarized in table form for specific streams, canals, lakes and wetlands. Also included is a waste source inventory

Florida Department of Environmental Regulation. 1981. Record of the Lake Tohopekaliga Task Force. Volume 1. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

____. 1979. State water quality management plan, water quality assessment. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.
Reference ID: 142
Keywords: Water quality/Kissimmee Basin/ Istokpoga Basin/Polk County/Okeechobee County/Orange County/Osceola County/Highlands County/Glades County/Kissimmee River/Arbuckle Branch/Fisheating Creek/Butler Lake/Lake Istokpoga/Reedy Lake/Lake Kissimmee/Tibet Lake/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study
A statewide water quality assessment was performed using 93 Florida permanent network stations. Study objectives were to identify good and poor water quality in Florida and determine inf cause and effect relationship could be established between pollution source (point vs. non point) and water quality. Information consisted of an average of 4 years data for 19 parameters. Watershed info included land use, estimated point source flow and average stream flow.

Study Conclusions
Comparison of lake, stream and estuary water quality was undertaken with results showing that each water body must be discussed separately due to their individual water quality characteristics. PNS sampled estuaries generally showed the lowest concentrations of pollution (N, P, BOD), greatest water clarity, (low

turbidity and high secchi) and greatest species diversity. Better quality due to large volume and increased flushing. Lakes showed increased phytoplankton concentrations by high chl a. Increased phytoplankton activity may also be indicated by increased turbidity, organic nutrients, pH, DO and TOC and decreased secchi and inorganic nutrients. Increased phytoplankton activity generally decreased water clarity and increased daytime DO and pH. Phytoplankton also may increase organic nutrient levels and reduce many concentrations. No significant coliform or P trends were shown in all three types of water bodies. One reason there may be a wide variety of total P concentrations found in streams ranging from very low concentrations to very high concentrations in areas of P mining.

Additional Comments
Water quality distribution described for 4 geographical areas including central and south Florida. Average data for 4 years data set is presented in table form for 19 parameters.

____. 1977. Wasteload allocation- Shining Creek. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.
Reference ID: 141
Keywords: Water quality/Nutrients/Shining Creek/Brad Jones/KCOL
Notes: Brent Anderson

____. 1980. Water quality and construction (revised). An element of the state water quality management plan. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.
Reference ID: 143
Keywords: Water quality/Construction/Glades County/Okeechobee County/Kissimmee Basin/ Istokpoga Basin/Polk County/Highlands County/Orange County/Osceola County/Construction/Kissimmee River/Fisheating Creek/River/ Surface water/Brad Jones /KCOL
Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study
Baseline assessment on status of construction related erosion problems in Florida. Includes extent of construction activities, impacts of sediment on water quality, preliminary non point assessment, water quality assessment, practices to mitigate adverse impacts, and effectiveness of current programs for controlling construction related erosion.

Study Conclusions
The primary contribution of sediment to Florida is unpaved roads. Construction of buildings and highways also contribute significantly to loss of productive soil and sediment of waters. Fisheating Creek and Kissimmee River loads (TSS) were 3.4 tons/day and 61.6 tons/day respectively.

Additional Comments
Contains sediment loads based on data collected from USGS water resources.

Florida Department of Natural Resources. 1974. Water and related land resources, Kissimmee River-Lake Okeechobee. Florida Department of Natural Resources, Tallahassee, Florida, USA.
Reference ID: 146
Keywords: Water quality/Water management/Resources/Kissimmee River/Lake Okeechobee/Brad Jones/KCOL
Notes: Brent Anderson

Florida Department of Pollution Control. 1974. Florida's urban stormwater runoff problem. Florida Department of Pollution Control, Tallahassee, Florida, USA.
Reference ID: 148
Keywords: Urban/Stormwater/Runoff/Stormwater runoff/Brad Jones/KCOL
Notes: Brent Anderson

____. 1974. Kissimmee- Lower Florida Water Quality Management Plans, Preliminary Draft. Florida Department of Pollution Control, Tallahassee, Florida, USA.
Reference ID: 147

Keywords: Kissimmee River/Water quality management plan/Water management/Brad Jones/KCOL
Notes: Brent Anderson

Florida Fish and Wildlife Conservation Commission. Date unknown. Bald eagle nest records. Raw dataset supplied by Steve Nesbitt and John White, FWC. Unpublished report on file in Tallahassee, Florida, USA.

____. 2003. Florida's Waterbird Colony Locator. URL: http://www.wildflorida.org/waders.
Reference ID: 348
Keywords: Birds/Wading birds/Stork/Colonies/Baseline/Gary Williams/KCOL
Notes: Recorded By Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?
Species richness, diversity, and relative abundance of rookeries

What parameters were monitored?
Wading bird nesting colony location, species composition, years of activity

What was the geographic extent of monitoring?
Upper Basin

How many samples or sample locations were monitored?
Entire Upper Basin

What was the sampling frequency and duration (period of record)?
At least once per year. Twice per year during 1976 1978. Surveys were conducted 1976 1978, 1986 1989, 1999

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
FWC

Where are the data located? (agency or organization maintaining database)
FWC

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Summaries of data are available for each colony.

Is a summary of findings presented in the document?
No. This is a web-based application that allows users to map the locations of nesting colonies in Florida. Colony locations are derived from statewide surveys (mostly aerial, some ground) conducted during 1976 1978, 1986 1989, and 1999. Tables associated with colony coordinates report activity status (yes/no) for the 1970s, 1980s, and 1990s, number of nests present during 1999 surveys, and nesting species (presence/absence). Nine colonies were contained within or located near regulated lakes in the Upper Basin. Five of the nine colonies were on Lake Kissimmee. During 1976-78 surveys, five colonies were active during at least one year and four had unknown status. During 1986 1989, all nine colonies were active during at least one year. Three colonies were active during 1999 surveys.

Florida Fish and Wildlife Conservation Commission, FWC Wildlife Technology Services Division. 2003. Eagle Nest Locator, online searchable GIS database. URL: http://wildflorida.org/eagle/eaglenests/Default.asp.

Reference ID: 325
Keywords: Eagle/Baseline/Birds/Gary Williams/KCOL
Notes: How are the data in this document applicable to the metrics we are evaluating?
Number of bald eagle nests/fledglings

What parameters were monitored?
Activity of eagle territories.

What was the geographic extent of monitoring?
Upper Basin

How many samples or sample locations were monitored?
All active territories in the Upper Basin

What was the sampling frequency and duration (period of record)?
Annually, 1999 2003. Note that the website details a small time period of the FWC's annual, statewide eagle monitoring program that was begun in the early 1970s.

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
FWC, under direction of Steve Nesbitt.

Where are the data located? (agency or organization maintaining database)
FWC database.

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Raw data are presented

Is a summary of findings presented in the document?
No. The website allows you to query bald eagle nesting activity using a variety of search methods, including county, nest id #, township, etc. Queries return tabular nest data detailing county, township, nest id #, latitude, longitude, years of activity from 1999 2003, and year last active. Note that *year last active* includes territories for which the last activity predates the 1999 2003 period; thus, you could obtain county, township, nest id #, latitude, longitude for nests that were active prior to 1999.

Florida Game and Fresh Water Fish Commission. Date unknown. East Lake Tohopekaliga 1990 extreme drawdown and muck removal project. An aquatic habitat and fishery management program. Florida Game and Freshwater Fish Commission, Division of Fisheries, Kissimmee, Florida, USA.
Reference ID: 389
Keywords: KCOL/Fish/Lawrence Glenn/Lake Tohopekaliga/Muck/Vegetation
Notes: Recorded by Brent Anderson 4/4/2005

____. 1997. Lake Jackson wildlife island and their impact on biological production on the area. Department of Environmental Protection , Kissimmee, Florida, USA.
Reference ID: 503
Keywords: KCOL/Lake Jackson/Wildlife Island/Biological production
Notes: Recorded by Brent Anderson 5/23/2005

____. 1995. Lake Kissimmee 1996 Lake Restoration Project. Florida Game and Fresh Water Fish Commission, Kissimmee, Florida, USA.
Reference ID: 483
Keywords: KCOL/Lake Kissimmee/Osceola County/Water quality/Nutrients/KCOL/Brad Jones/Muck/Vegetation
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
To address problems associated with degraded habitat, the Florida Game and Fresh Water Fish Commission implemented an extreme drawdown program in 1971. This restoration technique involves dewatering lakes to historic lows to consolidate bottom sediments and expand desirable aquatic plant communities. Extreme drawdowns mimic low water conditions prior to flood control (droughts), which historically occurred about every seven years on the lakes in the Kissimmee Chain. Therefore, to achieve the maximum benefits from extreme drawdowns, they should be repeated every 7-10 years. Recently, more intense in-lake restoration activities have been required to aggressively address rapidly deteriorating fish and wildlife habitat. Much removal, burning, discing and herbicide applications have been successfully used to reduce dense vegetation, tussock formation and organic build-up on lake bottoms.

Study Conclusions
This report is a proposal for the next major restoration project for Lake Kissimmee. The commissions lake restoration section is recommending implementation of a program for November 1995 that will include an extreme drawdown, muck removal, extensive burning, discing and hydrilla treatment. This project is necessary because of heavy build-up of organic sediments on the lake bottom, tussock formation and dense growth of littoral vegetation.

Additional Comments
Report contains a graph that shows the proposed drawdown schedule.

____. 1979. Phosphorous Loadings within the Lake Tohopekaliga System, Kissimmee, Florida, USA. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 149
Keywords: Lake Tohopekaliga/Kissimmee Basin/ Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

____. Date Unknown. Recommendations to the Lake Tohopekaliga Task Force. Unpublished report on file in Publication information unknown.

____. 1957. Recommended program for Kissimmee River Basin. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 414
Keywords: KCOL/Brad Jones

____. 1980. Untitled. Unpublished report on file in Place of publication Unknown.

Florida Game and Fresh Water Fish Commission. 1957. Waterfowl Inventories. Page Appendix A in Florida Game and Fresh Water Fish Commission, editor. Recommended program for Kissimmee River Basin. Florida Game and Fresh Water Fish Commission. Federal Aid Projects F-8-R, W-19-R, W-39-R.

Florida LAKEWATCH. 2003. Florida LAKEWATCH annual data summaries for 1986 through 2002. Unpublished report on file in Gainesville, Florida, USA.

Florida State Board of Conservation. 1969. Florida Lakes, Part III Gazetteer. Florida State Board of Conservation, Tallahassee, Florida, USA.
Reference ID: 151
Keywords: Gazetteer/Lakes/Florida lakes/Brad Jones/KCOL
Notes: Brent Anderson

____. 1966. Gazetteer of Floridas Streams. Florida State Board of Conservation, Tallahassee, Florida, USA.
Reference ID: 150
Keywords: Map/Florida Streams/Streams/Gazetteer/Brad Jones/KCOL
Notes: Brent Anderson

Florida State Board of Health. Date unknown. A report on the survey of Shingle Creek, Orange County, Florida, USA. Florida State Board of Health, Bureau of Sanitary Engineering, Jacksonville, Florida, USA.
Reference ID: 152
Keywords: Shingle Creek/Orange County/Survey/Brad Jones/KCOL
Notes: Brent Anderson

____. 1960. Some physical and chemical characteristics of selected Florida waters. Florida State Board of Health, Bureau of Sanitary Engineering, Division of Water Supply, Jacksonville, Florida, USA.
Reference ID: 153
Keywords: Kissimmee Basin/Istokpoga Basin/ Water quality/Lake/Surface water/Underhill Lake/Lake Placid/Lake Conway/Highlands County/Orange County/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study
This report is a tabulation of chemical and physical data on certain raw water sources in Florida (including surface waters) as part of a continuing effort to accumulate and maintain up-to-date information public water supplies. Tabulated summation of data is by country.

Additional Comments
Raw data only.

____. 1969. Some physical and chemical characteristics of selected Florida waters, second supplement. Florida State Board of Health, Bureau of Sanitary Engineering, Division of Water Supply, Jacksonville, Florida, USA.
Reference ID: 155
Keywords: Water quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson

____. 1965. Some physical and chemical characteristics of selected Florida waters, supplement. Florida State Board of Health, Bureau of Sanitary Engineering, Division of Water Supply, Jacksonville, Florida, USA.
Reference ID: 154
Keywords: Water quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson

Fontaine, T. D. III . 1978. Ecological systems model for Lake Conway, Florida. P.h.D. dissertation. University of Florida, College of Engineering, Gainesville, Florida, USA.
Reference ID: 157
Keywords: Lake Conway/Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Fontaine, T. D. III , and T. Davis . 1978. Community metabolism patterns and a simulation model of a Lake in Central Florida, USA. P.h.D. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 156
Keywords: Kissimmee Basin/Kissimmee Chain of Lakes/Lake/Lake Conway/Water quality /Nutrients/Nutrient loading/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study
For this study metabolism measurements were made and a model was developed and simulated to help understand food chain dynamics and the carbon and phosphorous cycles of a nutrient enriched, warm temperate lake (Lake Conway) which has significant growth of aquatic weeds. Data for the model was collected by Orange County Pollution Control Department.

Study Conclusions

Average annual community gross production and respiration (24 hr) in 1976 was 1150 g C/m^2 and 1193 g C/m^2 respectively. This implies rapid use of newly synthesized organic matter. Community metabolism is significantly depressed in summer months due possibly to temperature. Baseline simulation showed that metabolic turnover rates were high. This lead to less storage of nutrients in biomass or less transfer to consumer populations. This suggests that control over nutrient cycling in Lake Conway is exerted more at the producer level than the case of many northern lakes. The establishment of submerged plants has enabled nutrient in sediments to be reintroduced into the water column. Internal cycling of P by submerged plants was estimated to represent nearly half of the annual P input to the lake. Nutrient loading from outside sources has declined over the last few years and the simulation showed slowly declining submersed plant biomass and productivity after six year as nutrients were washed out. Deeper areas of the lake demonstrated moderate temperature stratification between April and September. The lake is typical of many limestone solution lakes found in Florida. Hardness and total alkalinity showed little variation around mean values of 60 mg/l and 35 mg/l (as $CaCO_3$) respectively. pH ranged between 6.0-8.6 with high values in the summer. Total P was generally low (x=0.02 mg P/l) and during half of the year, orthoP was < than detection limit. Concentrations of total P and orthoP was highest in winter, and lowest in summer. Total N is almost completely organic and averages 0.5 mg/l.

Fontaine, T. D. III, and K. C. Ewel. 1981. Metabolism of a Florida lake ecosystem. Limology and Oceanography 26:754-763.

Reference ID: 158

Keywords: Kissimmee Basin/Lake Conway/Water quality/Nutrients/Little Lake Conway/Orange County/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

Ecosystem and plankton community metabolism were measured for 1 year (1976) in Lake Conway Chain.

Study Conclusions

Values of ecosystem production and respiration were similar throughout the year suggesting that little net production accumulated seasonally or annually. Gross production and respiration were 3,071 and 3,180 gO_2 m-2 yr-1. The plankton community was responsible for 44% of the gross production; the remainder was attributable to submersed macrophytes and associated epiphytes. Of the annual respiration, 54% was due to plankton. Measurements of metabolism suggest that submersed plants photosynthesis and respiration were severely diminished for 1 month in the summer, possibly as a result of high temperatures.

Additional Comments

Some chemistry available- done by OCPCD (1976) TDS, AIK, pH, TP, OP, N, Secchi.

Fox, J. L., E. C. Blancher, F. M. Kooijman, R. A. Conley, and C. P. Feerick. 1977. Biological baseline studies of the Lake Conway, Florida, system. Pages 123-145 in W. E. S. U.S. Army Corps of Engineers, editor. Proceedings of the research planning conference on the aquatic plant control program. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA.

Reference ID: 159

Keywords: Kissimmee Basin/Orange County/Lake/Lake Conway/Gatlin Lake/Little Lake Conway/Surface water/Water quality/Phytoplankton/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

Chemical data collected in conjunction with biological sampling, secchi, D.O., temperature, pH, chl a

Study Conclusions

Temperatures showed normal seasonal fluctuations. A significant stratification did occur at deeper stations. Monthly variations in D.O. and pH showed no significant trends. Daily changes did show fluctuations that were consistent with productivity. Hypolimnetic D.O.'s reached zero in both pools of Lake Conway May-

August/ By September, no DO deficiency in any pools were found. Secchi temperatures decreased with increasing algal abundance in the summer. Secchi readings were low in northern stations. Chl a increased in summer, reflecting increased biomass. Variations between pools within any month showed increasing chlorophyll levels from south to north. Mean hypolimnetic DO, secchi and chl a in east and west pools and Lake Gatlin point to trophic states on the eutrophic side of mesotrophic. South and middle pools were classified as oligotrophic.

Foy, J. G. 1975. A mathematical model appied to the Shingle Creek Basin. M.S. dissertation. Florida Technological University, Orlando, Florida, USA.

Reference ID: 160

Keywords: Kissimmee Basin/Orange County/Shingle Creek/Kissimmee Chain of Lakes/Water quality/Surface water/Runoff/Pollution/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 2/24/2005

Brief Description of Study

This report investigates the general characteristics of stormwater runoff and applies a mathematical model "storm" to Shingle Creek Basin. Quality and quantity was investigated with parametric studies on changing loads.

Study Conclusions

Shingle Creek contributes the greatest amount of nutrients of all the watersheds in the Kissimmee River Basin, due mainly to the 2 sewage treatment plants. Throughout the stream, dissolved oxygen levels are consistently too low to support gamefish. BOD, N and P are high. The maximum runoff quality variations for the Shingle Creek Basin during the 9 month study were computed to be BOD (29.3), PO_4 (28.3), N (15.0), TSS (7.1) times higher than the average concentrations on an hourly basis. Pollution loads can be correlated with land use. Quality correlations to loads must consider runoff as the sum of overland and subsurface flow. A stream includes total runoff, but storm drain data only include overland runoff (and infiltration). This results in higher pollution concentrations in the drainage system.

Additional Comments

Data includes input "storm" loadings.

Freiberger, H. J. 1972. Nutrient survey of surface waters in Southern Florida during a wet and dry season, September 1970 and March 1971. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 161

Keywords: Nutrients/Kissimmee Basin/Istokpoga Basin/Stream/Surface water/Pollution/Eutrophication/Water quality/Kissimmee River/Harney Pond/C-41/Fisheating Creek/Indian Prairie canal/C-40/Glades County/Okeechobee County/Kissimmee Basin/Orange County/Shingle Creek/Kissimmee Chain of Lakes/Water quality/Surface water/Runoff/Pollution/Brad Jones/KCOL

Notes: Recorded by Brent Andeson 3/4/2005

Brief Description of Study

The main purpose of this study was to Provide: (1) Information for synoptic values for N and P in most of South Florida during wet and dry season (2) Background on nutrient concentrations (3) A base of N and P data to aid in established state standards (4) A base for determining trends (5) Bank of comprehensive data obtained from analyses made in "fresh" samples before decomposition altered the distribution of nutrient species.

Study Conclusions

Phosphorous concentrations averaged about 0.50 mg/l in the wet season, slightly higher in dry season. Many sites were less than 0.01 mg/l year round. NH_3-N ranged from 0.01-14 mg/l in wet season and .01-25 mg/l in dry season with average of 0.55 mg/l in wet and 0.50 in dry season. NO_3 and NO_2 are generally low in both seasons.

Additional Comments

Samples were analyzed within 6 hours by a mobile lab. Report contains general background data only.

Furey, P. C., R. N. Nordin, and A. Mazumder. 2004. Water level drawdown affects physical and biogeochemical propeties of littoral sediments of a reservoir and a natural lake. Lake and Reservoir Management 20:280-295.

Reference ID: 623

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Furse, J. B., and D. D. Fox. 1994. Economic fishery valuation of five vegetation communities in Lake Okeechobee, Florida. Pages 575-591 in A. G. Eversole, K. C. Overacre, B. D. Leopold, M. Konikoff, B. Chapman, and L. Hartfield, editors. Proceedings of the 48th Annual Conference of the Southeast Association of Fish and Wildlife Agencies. Southeast Association of Fish and Wildlife Agencies, Charleston, South Carolina, USA.

Reference ID: 509

Keywords: Fish/Vegetation/Lake Okeechobee/KCOL/Robert Pace

Notes: Recorded by Brent Anderson 5/24/2005

Gaggiani, N., and B. F. McPherson. 1978. Limnological characteristics of Cypress Lake, Upper Kissimmee River Basin, Florida, USA. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 162

Keywords: Lake Cypress /Lake Tohopekaliga/Lake Hatchineha/Storage Capacity/Surface Area/Nutrients/Kissimmee River/Kissimmee Basin/Surface water/Osceola County/Lake Tohopekaliga/East Lake Tohopekaliga/Boggy Creek/Shingle Creek/Southport Canal/C-35/KCOL/Brad Jones/KCOL

Notes: Recorded by Brent Andeson 3/30/2005

Brief Description of Study

Evaluation of the limnology of the lakes in the Kissimmee River Basin is made at the end of the summer, once annually, by the geological survey and water management district. Also existing limnological data are summarized with particular emphasis placed upon trophic state. Cypress Lake was chosen first because (1) it is a major lake directly connected to other large lakes, (2) it is the least studied, (3) it is immediately downstream of a lake directly affected by runoff from areas given over to urban development. The purpose of this map is to summarize the limnological data on Cypress Lake and to evaluate the Lakes trophic condition.

Study Conclusions

DO and temperature of Cypress Lake are not subject to prolonged stratification. Lakes in the upper Kissimmee Basin have been increasingly affected by urbanization during the 1960's and 1970's. Municipal sewage plants of Orlando discharge 1.8×10^6 lbs P annually to surface waters of the upper basin. Roughly 35% of Orlando metro area contributed urban runoff to the basin. Urban runoff high in coliforms, solids, nutrients, metals, PCB's and a high BOD. Much enters Lake Tohopekaliga through Shingle and Boggy Creeks via East Lake Tohopekaliga. The increased loads of pollution from urban development have adversely altered quality in Lake Tohopekaliga 5 miles upstream of Lake Cypress drainage via Southport canal (C-35). A chemical gradient from N to S is evident in Lake Tohopekaliga. Concentrations of nutrients generally are highest in it where major sewage effluent enters. Cones of N and P are relatively low in Cypress Lake and are within limits expected for Florida lakes not greatly enriched. Total N were 1.8 mg/L while total P were 0.07 mg/L. Concentrations of dissolved solids increased appreciably in Cypress Lake between 1954 and 1975 indicating increased enrichment. Specific conductance also increased from average of 79 µ moles/cm between 1954-1964 indicating increased enrichment. Specific conductance also increased from average of 79 µ moles/cm between 1964 and 1975; after the regulation. Cypress Lake is colored, alkaline lake. In Kissimmee River basin pesticides are used on citrus, crops, pastures, homes, mosquito control and aquatic weeds. The only pesticide found in Cypress Lake sediments were DDD and DDE and were low. In water only Fe and Al increased 100 ppb. Most elements were low concentrations or not detected.

Abstract: Cypress Lake is in the upper Kissimmee River basin in Florida between Lake Tohopekaliga and Lake Hatchineha. It is remote from urban development and extensive agriculture. Nevertheless,

most of the inflow to the lake, about 302,000 acre-ft per year, comes from 2 canals and a creek that drain the upper part of the basin which receives effluent from about 35 percent of the Orlando metropolitan area. With this inflow and a lake volume of 26,100 acre-ft, water in the lake is renewed about every 0.1 year. Cypress Lake has a surface area of 6.4 sq mi, a mean depth of 6.4 ft, an immediate overland drainage area of 29 sq mi and with Lake Hatchineha, receives drainage from 1,162 sq mi. From 1950 to 1964, before locks and dams at the outlets of Lakes Kissimmee and Tohopekaliga regulated water levels at Cypress Lake, water levels fluctuated from 57 ft msl to 48 ft msl, periodically flooding the surrounding area. After regulation from 1964 to 1975, the maximum water level at Cypress Lake was slightly more than 54 ft msl. Specific conductance of the water increased in Cypress Lake from an average of 76 micromho/cm in 1954-65 before regulations to 130 micromho/cm in 1964-75 after regulation. Cypress Lake is classified as a colored alkaline lake with an average color of 79 platinum cobalt units. Emergent marsh vegetation covers almost all the shoreline of the lake. (Woodard-USGS).

Gangstad, E. O. 1992. Ecological and environmental impacts of hydrilla.
Reference ID: 514
Keywords: Hydrilla/General
Abstract: Hydrilla (Hydrilla verticillata Royle) is found in rivers, lakes and streams and impounded bodies of water particularly in calcarious sites. It can tolerate moderate amounts of salinity up to 33% sea water strength. It proliferates under low 0.5-0.75% sunlight and therefore is very competitive with native American species. Large mats are often formed at the water surface resulting in a monotypic stand of hydrilla. Large concentrations of the plant are found in Florida, Georgia, Louisiana, Texas, Iowa, and California. Hydrilla interferes with fisheries, waterflow, boat traffic and domestic uses of the water.

Gatewood, S. E., and P. B. Bedient. 1975. Drainage density in the Lake Okeechobee drainage area. University of Florida, Department of Environmental Engineering, Gainesville, Florida, USA.
Reference ID: 164
Keywords: Istokpoga Basin/Kissimmee Basin/ Lake Okeechobee/Water quality/KCOL/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
This study was to describe and characterize drainage patterns, specifically drainage density in drainage basins contributing flows to Lake Okeechobee. The drainage density index is computed for each hydrologic unit or watershed and relates to land use, soil storage, water quality and other parameters affecting the hydrologic functioning of a watershed. Study evolved from Heaney et al 1975; Bedient 1975.

Study Conclusions
In summary, man has enacted profound changes on drainage patterns and processes in the Okeechobee drainage basin. These changes have resulted in profound changes in hydrologic processes and water quality. Drainage density is closely related to land use intensity. Some relationships between drainage density and water quality and hydrologic parameters have been identified, but further investigation into the interactions of the parameters is necessary.

Gatewood, S. E., and G. Cornwell. 1975. An analysis of cattle ranching in the Kissimmee River Basin. Ecoimpact, Inc., Gainesville, Florida, USA.
Reference ID: 165
Keywords: Kissimmee Basin/Water quality/Nutrients/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
Investigation of the ecology of the Kissimmee River Basin native range improved pasture associated cattle farming methods and grassland ecosystems and their use to sustain livestock. Research focused primarily on effects of cattle ranching on water quality, average production of native and improved range, cattle carrying capacity of march, native range and improved pasture, methods for improving the quality of runoff from improved pasture, and effects which the decanalization of C-38 and upland water retention would likely have on Basin ranching and on the quality of water emanating from ranching areas.

Study Conclusions
Beef cattle production from pasture and native range is the largest land use in the Basin. Extensive native range occurs throughout the basin, but much is of poor quality due to area grazing and poor management. Conversion of native range to improved pasture is occurring. Adverse water quality effects of improved pastures appear to be significant and could have a detrimental effect on environmental quality. The present tax structure favors reclaiming native rangeland and converting to improved pasture. This is clearly inconsistent with the well being of C-38 and Lake Okeechobee.

Additional Comments
Findings and conclusions based upon analysis and synthesis of available data in the literature and in unpublished reports, interviews with ranchers, extension agents, University researchers, other specialists, and direct field observations. Report contains current land use practices, vegetation of basin, cattle management in the basin, fertilization rates and schedule.
No raw data, only generalized observations.

Gayle, T. L. 1975. Systems models for understanding eutrophication in Lake Okeechobee, Florida, USA. M.S. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 166
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Stream/Kissimmee River/Kissimmee chain of lakes/Fisheating Creek/Indian Prairie Canal/C-40/Taylor Creek/Water quality/Nutrients/Lake Okeechobee/KCOL/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
Systems models were developed to investigate ecological changes and eutrophication trends in Lake Okeechobee, Florida. An energy flow model was used to organize data and concepts in the lake as a system. Simplified models of water budget, phosphorous budget, metabolism,and water currents were simulated to estimate the effects of changes in river flow, water levels, and nutrient loads.

Study Conclusions
Present P loading rates to the lake from rain and tributaries were 0.3 0.4 gP/m2/yr. Nearly 90% of this P load was unaccounted for in outflow and could be trapped by sediment.

Additional Comments
Contains estimated loadings to Lake Okeechobee. During 1952 and Kissimmee River, Fish Eating Creek, Taylor Creek, and Indian Prairie Canal. Data (N and P loads) generally are representatively of Lake Okeechobee with no raw or specific/general data in the tributaries.
Model of surface water data with alternate quality influential sources (rain, plants, soils, etc.)
No data collected by this author on water quality, used other sources between this date range.

George Aase and Associates, Inc. 1965. Availability of fresh water in the East Central Florida planning region. East Central Florida Regional Planning Council, Tallahassee, Florida, USA.
Reference ID: 64
Keywords: Kissimmee Basin/Water quality/Orange County/Osceola County/Polk County/Nutrients/Brad

Jones/KCOL
Notes: recorded by Brent Anderson

Brief description of study

The purpose of this investigation was to summarize the presently existing data covering; (1) total available fresh water resources of the region; (2) quality of the water; (3) location of potential future supplies; (4) water problems of the region; (5) Possible solutions to water problems; (6) areas where additional studies and data are needed; (7) to interpret and compile all available water data into a single report that will be useful in regional planning.

Study Conclusions

The quality of surface water in the Green Swamp area is generally good (based upon Chloride concentrations). Although surface water supplies in the Kissimmee River Basin are abundant and of good quality, little is made of surface water except for agricultural purposes.

Additional Comments

Only chlorides were considered. Concentration of chlorides generally less than or equal to 25ppm throughout most of Orange and Osceola Counties except the extreme east regions where chlorides increase progressively toward the coast. The report does contain a water budget (Kissimmee and adjacent areas). The report is predominantly groundwater, but a section is included on surface water quality.

German, E. R. 1986. Summary of hydrolic conditions in the Reedy Creek Improvement District, Central Florida. U.S. Geological Survey, Tallahassee, Florida, USA.
Reference ID: 511
Keywords: Reedy Creek/Hydrology/KCOL/Robert Pace
Notes: Recorded by Brent Anderson 5/24/2005

Gerritsen, J., B. Jessup, E. W. Leppo, and J. White. 2000. Development of lake condition indexes (LCI) for Florida. Florida Department of Environmental Protection, Tallahassee, Florida, USA.
Reference ID: 336
Keywords: Macroinvertebrates/Joe Koebel/KCOL
Notes: Recorded by Brent Anderson

How are the data in this document applicable to the metrics we are evaluating?

This paper documents the strategy used to develop a LCI for Florida lakes

What parameters were monitored?

Benthic macroinvertebrates, phytoplankton (species composition), Chl *a*, algal growth potential. Secchi depth, water chemistry (alkalinity, conductivity, DO, pH, turbidity, total NH_3, NO_3, NO_2, total Kjeldahl N, total orthophosphorus, total P), sediment fractions (1993-94 only)

What was the geographic extent of monitoring?

All of Florida, including numerous lakes in the KUB.

How many samples or sample locations were monitored?

In 1993-94, one to three sites were selected in each lake, and six sediment grabs were collected at each site. In 1995, in lakes greater than 1000 acres, the sublittoral zone of each lake was divided into 12 equal segments. One grab sample was collected from each of the 12 segments. Lakes smaller than 1000 acres were represented by a single 100-organism sample.

What was the sampling frequency and duration (period of record)?

Reference and test lakes were sampled from 1993 to 1997.

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

Florida Department of Environmental Protection (FDEP)

Where are the data located? (agency or organization maintaining database)

FDEP database (presumably)

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Because data were collected and analyzed by FDEP, data quality are likely very good.

Are raw data and/or summarized data presented in the document?

Yes.

Is a summary of findings presented in the document?

Yes.

Comments: This effort developed three benthic invertebrate indexes of lake biological condition, and two water quality indexes of lake trophic condition. No single index was able to discriminate between reference and non-reference lakes for all five lake types (acid-clear lakes of ecoregion 65, acid-clear lakes of ecoregion 75, acid-colored lakes, alkaline-clear lakes, and alkaline-colored lakes). Macroinvertebrate indexes were more effective in clear lakes but not in highly colored lakes, and trophic indexes were more reliable in colored lakes, but not in clear lakes. Therefore, the authors recommend the use of two indexes to assess Florida lakes: the benthic macroinvertebrate index for clear lakes, and the chlorophyll-Secchi trophic index for colored lakes. These indexes appear to respond to eutrophication. For mandated assessment purposes, FDEP could assign ordinal rating to LCI that would correspond to very good, good, poor, and very poor.

J.W. Koebel Jr. 2/28/2005

Goldstein, A. L. 1982. Effects of agricultural land uses on quality of runoff. Pages 77-96 in P. M. McCaffrey, T. Beemer, and S. E. Gatewood, editors. Proceedings of the progress in wetlands utilization and management symposium. Coordimating Council on the Kissimmee River Valley and Taylor Creek- Nubbin Sloth Basin, Tallahassee, Florida, USA.
Reference ID: 167
Keywords: LTMP/Kissimmee Basin/ Highlands County/Osceola County/Okeechobee County/Ash Slough/Water quality/KCOL/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
Evaluate detention/retention systems for effectiveness as BMP's. Water and nutrient budgets calculated. The study addresses the efficiency of treatment of nutrient loads to each watershed attributable to rainfall.

Study Conclusions

Land use practices necessary to maintain pasture to support increased cattle stocking density, rather than cattle themselves, are potentially responsible for the observed impacts on water quality, at least at densities of 0.33 cows per acre or less. N and P export rates from Ash Slough W greater than those calculated for those calculated Ash Slough E although land use is similar. Difference due to extensive ditching. In summary (1) land use intensity (as cattle grazing density) can be correlated with export rates of nutrients of nutrients from respective watersheds, (2) Drainage density is an important factor in export rates from the watershed and may be extensive enough to overshadow other practices, (3) Watersheds in general absorb and store quantity of nutrients normally found in rainfall, (4) cattle stocking densities of < 0.25 cows/acre appear to seriously impact water quality in runoff, (5) Water quality impact of runoff is probably more a factor o supplemental fertilization to maintain pasture then as a direct impact of no cattle, though one is directly dependent of upon the other.

Goldstein, A. L., T. K. MacVicar, R. L. Mierau, M. L. Smith, and R. J. Ulevich. 1980. Upland detention/retention demonstration project semianual report to the coordinating council on the restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Goodrick, R. L., and J. F. Milleson. 1974. Studies of floodplain vegetation and water level fluctuation in the Kissimmee River Valley. Technical Publication 74-2. Central and Southern Florida Flood Control District, West Palm Beach, Florida, USA.

Goolsby, D. A., H. C. Mattraw, A. G. Lamonds, D. V. Maddy, and J. R. Rolle. 1976. Analysis of historical water-quality data and description of plan for a sampling network in central and southern Florida. U.S. Geological Survey, Tallahassee, Florida, USA.

Reference ID: 169

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Okeechobee County/Osceola County/Highlands County/Orange County/Glades County/Polk County/Stream/Lake/Wetlands/Ash Slough/Water quality/KCOL/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study

Report represents results of analysis of historical water quality data collected by USGS from ~130 streams, canals and lakes in central and south Florida. The evaluation has 3 primary objectives: (1) examine existing surface water quality network and analyze available database in FCD to determine areal patterns and temporal changes in water quality and relations between water quality based on statistical measures; (2) define specific objectives which should be met by a water quality network and develop an operational design combining all regional and local networks, and (3) develop a plan to analyze data and network evaluated at least annually so that adjustments can be made in the network if objectives are not being accomplished or if new objectives are defined.

Study Conclusions

Concentrations are highest along mainstream if St. Johns River in canals draining Indian river County Agricultural Area and in agricultural area south of lake Okeechobee. Concentrations of major constituents are lowest in Kissimmee River and lakes of Kissimmee River Basin, however, concentrations have increased ~50% at several locations in the last 20 years. Within the last 10-20 years, specific conductivity show long term increases in St. Johns, lower Kissimmee River and Fisheating Creek, probably associated with man's activities. Total N and P averaged 182 mg/l and 0.15 mg/l respectively. 77% of N was organic, 14% ammonia, 9% NO^3. ~80% of P was soluble OPO^4. Concentrations of inorganic N and P are usually highest in early summer, beginning of the wet season. Concentrations of P are highest in water flowing to Lake Okeechobee and canals in the Indian River area; inorganic N concentrations were highest in agricultural areas south of Lake Okeechobee except for Hg, trace metals concentrations were generally several times to an order of magnitude < the critical value for various water use. Hg concentration averaged 35 ppb south of Tamiami Canal. Only DDT, DDD, DDE were detected in < 12% of samples (n=360). Average BOD ranged from 1.3mg/l in St. Johns and lower Kissimmee River to 2.9 mg/l in Taylor Creek and Hillsborough Canal systems. Average organic C ranged from 14 mg/l in Kissimmee River to 27 mg/l in

Hillsborough, North New River and Miami Canal.

Gray, P. N. 2002. Water level management needs of the Upper Chain of Lakes. Unpublished report on file in Lorida, Florida, USA.

Greening, H., and S. Doyon. 1990. Environmental and ecological effects of drawdown and enhanced fluctuation for Lake Apopka, Florida. St. Johns Water Management District, Palatka, Florida, USA.
Reference ID: 478
Keywords: KCOL/Vegetation/Fish/Lawrence Glenn
Notes: Recorded by Brent Anderson 4/24/2005

Gregory, R. W., A. V. Zale, and R. Conrow. 1990. Distributions and abundances of early life stages of fishes in a Florida lake dominated by aquatic macrophytes. Transactions of the American Fisheries Society 119:521-528.
Reference ID: 541
Keywords: Orange Lake/Hydrilla/Vegetation/Fish
Abstract: The early life stages of fishes were sampled with tow nets and light traps in Orange Lake, Florida in order to determine the habitat use and seasonal occurrences of larval and juvenile fishes in a lake dominated by aquatic vegetation. From June 1983 to June 1984, four habitats were sampled, one open water and three vegetated. Vegetated zones were dominated by panic grass, Panicum species, hydrilla, Hydrilla verticillata, or a community of mixed floating and emergent vegetation. Vegetated zones of any type were important nursery areas for the fish assemblage. Mixed vegetation was an important nursery area for juvenile fish of many species, perhaps due to its structural complexity, and the panic grass was especially important for larvae. Larvae of most species first appeared in Orange Lake at temperatures similar to those at which they appear in temperate lakes, but larvae were present on almost all sampling dates (including those in winter). Larvae of golden shiners Notemigonus crysoleucas, threadfin shad Dorosoma petenense, and gizzard shad D. cepedianum appeared on earlier dates than in temperate systems. Larvae of individual species were present over a longer period than in temperate systems, reflecting longer spawning seasons in Orange Lake. Habitat use by larvae was variable for several species; larval bluegills Lepomis macrochirus, which are typically considered limnetic, inhabited panic grass and hydrilla, in addition to open water. (Author 's abstract)

Griffith, G. E., D. E. Canfield, Jr., C. A. Horsburgh, and J. M. Omernik. 1997. Lake regions of Florida. U.S. Environmental Protection Agency, Corvallis, Oregon, USA.
Reference ID: 416
Keywords: KCOL/Brad Jones

Grimshaw, H. J. 2002. Nutrient release and detritus production by herbicide-treated freely floating aquatic vegetation in a large, shallow subtropical lake and river. Archiv Für Hydrobiologie 153:469-490.
Reference ID: 417
Keywords: KCOL/Brad Jones/Vegetation

Grocki, D. R. 1975. The influence of water level fluctuations on the productivity of Lake Kissimmee, Florida. M.S. dissertation. University of Florida, Department of Environmental Engineering, Gainesville, Florida, USA.
Reference ID: 170
Keywords: Lake Kissimmee/Water level fluctuations/Hydrology/Productivity/Lake productivity/Brad Jones/KCOL

Notes: Brent Anderson

Gruber, A. Date unknown. The energy budget and climatological description of the atmosphere over the Florida Peninsula when a convective regime deminishes. Technical Report No. ECOM-04367-F. Publication information unknown.

Guardo, M. 1992. An atlas of the Upper Kissimmee surface water management basins. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Gunsalus, B., E. G. Flaig, and G. Ritter. 1992. Effectiveness of agricultural best management practices implemented in the Taylor Creek/Nubbin Slough and the lower Kissimmee River basins. Pages 161-172 in South Florida Water Management District and others, editor. Proceedings of the RCWP Symposium, 10 Years of Controlling Nonpoint Source Pollution: The RCWP Experience. U.S. Environmental Protection Agency, Cincinati, OH, USA.
Reference ID: 510
Keywords: KCOL/Nubbin Slough/Taylor Creek/Nutrients/Nonpoint pollution/Pollution control/Agriculture/BMPs/Kissimmee Basin/Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/24/2005

Hanlon, C. G. 1999. Relationship between total phosphorus concentrations, sampling frequencies, and wind velocity in a shallow, polymictic lake. Lake and Reservoir Management 15:39-46.
Reference ID: 571
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Hanlon, S. G., M. V. Hoyer, C. E. Cichra, and D. E. Canfield, Jr. 2000 . Evaluation of macrophyte control in 38 Florida lakes using triploid grass carp. Journal of Aquatic Plant Management 38:48-54.
Reference ID: 563
Keywords: Vegetation/Hydrilla
Abstract: Florida's large number of shallow lakes, warm climate and long growing season have contributed to the development of excessive growths of aquatic macrophytes that have seriously interfered with many water use activities. The introduction of exotic aquatic macrophyte species such as hydrilla (Hydrilla verticillata) have added significantly to aquatic plant problems in Florida lakes. The use of grass carp (Ctenopharyngodon idella) can be an effective and economical control for aquatic vegetation such as hydrilla. Early stocking rates (24 to 74 grass carp per hectare of lake area) resulted in grass carp consumption rates that vastly exceeded the growth rates of the aquatic plants and often resulted in the total loss of all submersed vegetation. This study looked at 38 Florida lakes that had been stocked with grass carp for 3 to 10 years with stocking rates ranging from < 1 to 59 grass carp per hectare of lake and 1 to 207 grass carp per hectare of vegetation to determine the long term effects of grass carp on aquatic macrophyte communities. The median PAC (percent area coverage) value of aquatic macrophytes for the study lakes after they were stocked with grass carp was 14% and the median PVI (percent volume infested) value of aquatic macrophytes was 2%. Only lakes stocked with less than 25 to 30 fish per hectare of vegetation tended to have higher than median PAC and PVI values. When grass carp are stocked at levels of > 25 to 30 fish per hectare of vegetation the complete control of aquatic vegetation can be achieved, with the exception of a few species of plants that grass carp have extreme difficulty consuming. If the management goal for a lake is to control some of the problem aquatic plants while maintaining a small population of predominately unpalatable aquatic plants, grass carp can be stocked at approximately 25 to 30 fish per hectare of vegetation.

Hansen, P. S., E. J. Philips, and F. J. Aldridge. 1997. The effects of sediment resuspension on phosphorus available for algal growth in a shallow subtropical lake, Lake Okeechobee. Lake and Reservoir Management 13:154-159.

Reference ID: 578

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 5/31/2005

Harris, R. C. 1966. Silica and chloride in interstitial waters of river and lake sediments. Limnology and Oceanography 11:8-12.

Reference ID: 172

Keywords: Lake sediments/River sediments/Water quality/Nutrients/Brad Jones/KCOL

Notes: Brent Anderson

Harris, R. C., and R. R. Turner. 1974. Job completion report: Lake Jackson Investigations to the Florida Game and Freshwater Fish Commission. University of Florida, Marine Laboratory, Tallahassee, Florida, USA.

Reference ID: 174

Keywords: Lake Jackson /Brad Jones/KCOL/Vegetation

Notes: Brent Anderson

____. 1974. Lake Jackson Investigations. Florida State University, Marine Laboratory, Tallahassee, Florida, USA.

Reference ID: 173

Keywords: Lake Jackson /Brad Jones/KCOL

Notes: Brent Anderson

Harter, R. P. 1968. Adsorption of phosporous by lake sediment. Soil Scientific Society of America Proceedings 32:514-518.

Reference ID: 175

Keywords: Nurients/Water quality/Brad Jones/KCOL

Notes: Brent Anderson

Harwell, M. C., and K. E. Havens. 2003. Experimental studies on the recovery potential of submerged aquatic vegetation after flooding and desiccation in a large subtropical lake. Aquatic Botany 77:135-151.

Reference ID: 549

Keywords: Lake Okeechobee/Vegetation/Hydrilla

Abstract: In Lake Okeechobee (Florida), above average water depths from 1994 to early 2000 created poor light conditions on the lake bottom, leading to a widespread loss of submerged aquatic vegetation. In 2000, a controlled laboratory study quantified seedling emergence of Vallisneria americana (80 +/- 20 m(-2); mean +/- S.E.) and emergence of Chara spp. (504 +/- 21 m(-2); mean +/- S.E.) from sediments collected at a variety of sites confirming that a viable seed bank had persisted through years of poor light conditions. Considerable variance existed among the five sites from which seed banks were collected. Other species of submerged vegetation were hardly encountered. Additionally, a field transplant study using young V americana plants examined the survival potential of V americana in regions that had not supported submerged vegetation in the recent past. Although all transplants lost biomass, they produced new shoots and stolons in both sediment types. Transplants fared better in peat sediments than in the sandy sediments characteristic of areas where submerged vegetation was lost in the recent past.

In summer 2001, an extensive drought exposed thousands of hectares of near-shore lake bottom, killing much of the submerged vegetation community. The potential for recovery

of submerged vegetation from a desiccated and re-inundated seed/oospore bank was examined with cores taken from areas that had previously supported submerged vegetation. Extensive emergence of Chara spp., including a faster rate of emergence and a greater magnitude of emergence observed in desiccated cores (mean from three sites: 2728 m(-2); I S.E.: +/-192) relative to cores still inundated (mean from one site: 918 m(-2); I S.E.: +/-165), suggests that the drought may have led to an increased germination response for Chara. In contrast, there was little germination of vascular species except for a few seedlings of the native V americana and a few plants of Hydrilla verticillata.

Havens, K., T. L. East, J. Marcus, P. Essex, B. Bolin, S. Raymond, and J. R. Beaver. 2000. Dynamics of the exotic *Daphnia lumholtzi* and native macrozooplankton in a subtropical chain-of-lakes in Florida, USA. Freshwater Biology 45:21-32.

Reference ID: 335

Keywords: Macroinvertebrates/Joe Koebel/KCOL
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?

Data apply to zooplankton species richness, composition, and biomass

What parameters were monitored?

Depth, pH, Secchi depth, TP, Chl a, zooplankton species composition, abundance and biomass

What was the geographic extent of monitoring?

Kissimmee Upper Basin including Fells Cove, East Lake Tohopekaliga, Lake Tohopekaliga, Lake Cypress, Lake Hatchineha, and Lake Kissimmee

How many samples or sample locations were monitored?

A total of six sites (one in each lake) that corresponded to locations where routine water quality sampling occurs

What was the sampling frequency and duration (period of record)?

Approximately monthly intervals from April 1997 to February 1999.

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

Collected by the author(s)

Where are the data located? (agency or organization maintaining database)

Original raw data are held by the Okeechobee Division, SFWMD. Data have been summarized in Freshwater Biology 45:21-32

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical

lab? Chain of custody protocol?, etc.)

Unknown

Are raw data and/or summarized data presented in the document?

Yes.

Is a summary of findings presented in the document?

Yes.

Comments: Study does a good job in presenting biomass trends of dominant zooplankton at each study site. The six lakes displayed macro-zooplankton communities similar to those previously described in the subtropics and tropics. Although data were collected over a relatively short time frame, they may be useful in developing baseline conditions for species richness, diversity, composition, and biomass.

J.W. Koebel Jr. 2/28/2005

Havens, K. E. 2002. Development and application of hydrologic restoration goals for a large subtropical lake. Lake and Reservoir Management 18:285-292.
Reference ID: 605
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 2003. Phosphorus-algal bloom relationships in large lakes of South Florida: Implications for establishing nutrient criteria. Lake and Reservoir Management 19:222-228.
Reference ID: 614
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 1994. Relationships of annual chlorophyll a means, maxima and algal bloom frequencies in a shallow eutrophic lake (Lake Okeechobee, Florida, USA). Lake and Reservoir Management 10:133-138.
Reference ID: 590
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 1994. Seasonal and spatial variation in algal bloom frequencies and intensities in Lake Okeechobee, Florida, USA. Lake and Reservoir Management 10:139-148.
Reference ID: 591
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

____. 2003. Submerged aquatic vegetation correlations with depth and light attenuating materials in a shallow subtropical lake. Hydrobiologia 493:173-186.
Reference ID: 551
Keywords: Lake Okeechobee/Vegetation/SAV/Biomass
Abstract: A 3-year study was done to quantify the biomass of submerged aquatic vegetation (SAV) and its relationship with environmental attributes in Lake Okeechobee, the largest lake in the southeastern United States. Plants were sampled on 21 occasions at sites located along 15 fixed transects around the shoreline, giving rise to 721 observations of SAV species (Chara spp., Vallisneria americana, Hydrilla verticillata, Potamogeton illinoinensis) dry weight biomass. Environmental sampling focused on factors that

attenuate light, including phytoplankton chlorophyll a (chl a), total suspended solids (TSS), non-volatile suspended solids (NVSS) and color. Depth and Secchi transparency also were measured. Based on regression analysis, NVSS was considerably more important in attenuating light than chl a or color. Total biomass of SAV varied from 0 to 271 g dw m(-2), with a mean of 4.7 g dw m(-2), and strong dominance by Chara. The SAV biomass was lower than average for Florida lakes, and may reflect the influence of suspended solids on underwater irradiance, as well as high water level in the late 1990s. Dense SAV was found only where depth was < 2 m and TSS < 20 - 30 mg l(-1). At locations where high biomass of SAV occurred, the plants may have influenced water quality, because concentrations of TSS, NVSS, and chl a were 2 - 3 fold lower than at sites with no plants. The potential effects of SAV also were apparent at a regional scale. The shoreline region of the lake displayed a pattern of rising and falling chl a and NVSS with water depth. This occurred both at sites with and without plants, suggesting that it may be driven by physical processes, such as water circulation patterns, which are influenced by depth. However, the pattern was dampened at sites with SAV, indicating a potential to influence these attributes of water quality.

____. 1997. Water levels and total phosphorus in Lake Okeechobee. Lake and Reservoir Management 13:16-25.
Reference ID: 579
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Havens, K. E., H. J. Carrick, E. F. Lowe, and M. F. Coveney. 1999. Shallow subtropical lakes: Lakes Okeechobee and Apopka (Florida, USA). Lake and Reservoir Management 15:298-309.
Reference ID: 574
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Havens, K. E., and T. East. 1997. In situ responses of Lake Okeechobee (Florida, USA) phytoplankton to nitrogen, phosphorus, and Everglades Agricultural Area canal water. Lake and Reservoir Management 13:26-37.
Reference ID: 580
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Havens, K. E., and R. T. James. 1997. A critical evaluation of phosphorus management goals for Lake Okeechobee, Florida, USA. Lake and Reservoir Management 13:292-301.
Reference ID: 575
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Havens, K. E., and R. T. James. 1999. Localized changes in transparency linked to mud sediment expansion in Lake Okeechobee, Florida: Ecological and Management Implications. Lake and Reservoir Management 15:54-69.
Reference ID: 572
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Havens, K. E., and G. K. Nurnberg. 2004. The phosphorus-chlorophyll relationship in lakes: Potential influences of color and mixing regime. Lake and Reservoir Management 20:188-196.
Reference ID: 621
Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Havens, K. E., and C. L. Schelske. 2001. The importance of considering biological processes when setting total maximum daily loads (TMDL) for phosphorus in shallow eutrophic lakes. Environmental Pollution 113:1-9.

Reference ID: 419

Keywords: KCOL/Brad Jones

Havens, K. E., B. Sharfstein, M. A. Brady, T. L. East, M. C. Harwell, R. P. Maki, and A. J. Rodusky. 2004. Recovery of submerged plants from a high water stress in a large subtropical lake in Florida, USA. 78:67-82.

Reference ID: 548

Keywords: Lake Okeechobee/Vegetation/Hydrilla

Abstract: The spatial and temporal dynamics of submerged plants were examined in a large subtropical lake in Florida, USA. The objective was to characterize succession of the community following a natural experiment in 2000-2001, when release of water from the lake, followed by a severe drought, reduced water levels by 2 m, alleviating stress of multiple years of high water. A systematic survey of shoreline transects was used to compare attributes of submerged plants under pre-drought versus post-drought conditions. Initially, the plants did not respond to lower water because shoreline areas had high turbidity from resuspended sediments and, later algal blooms. In June 2000, approximately 2 months after the water level was lowered, Chara (a macro-alga) rapidly expanded across the near-shore landscape. For over I year, this plant strongly dominated the submerged plant community, with just scattered individuals or isolated beds of vascular plants, including Potamogeton, Vallisneria, and Hydrilla. This included a period when the lake reached a record low elevation, where much of the habitat became dry, and then subsequently re-flooded in late summer 2001. However, in November 2001, Chara rapidly declined and vascular taxa (Hydrilla and Potamogeton) became dominant. They subsequently increased their biomass and spatial extent, and the previous Chara dominance did not return. Just prior to the loss of Chara, a frontal system passed over the lake, with wind velocities in excess of 30 km h(-1) for 3 days. Concentrations of solids in the water more than doubled and uprooted Chara was observed floating in the water. In this large, wind-driven lake, Chara may only be an ephemeral pioneer because, lacking roots, it is probably more sensitive to excessive wind-related stress (e.g. wave energy and scouring) than vascular plants. (C) 2003 Elsevier B.V. All rights reserved.

Havens, K. E., and W. W. Walker, Jr. 2002. Development of a total phosphorus concentration goal in the TMDL process for Lake Okeechobee, Florida (USA). Lake and Reservoir Management 18:227-238.

Reference ID: 604

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Heath, R. C., and C. S. Conover. 1981. Hydrologic Almanac of Florida. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 176

Keywords: LTMP/Istokpoga Basin/Okeechobee County/Osceola County/Highlands County/Orange County/Glades County/Polk County/Stream/Lake/Wetlands/Kissimmee River/Fisheating Creek/Water quality/KCOL/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 3/31/2005

Study Conclusions
Report includes map series from Dysart, Goolsby and Kaufman with explanations. Dissolved solids data mainly. Also includes groundwater quality. Section and quality standards as they apply to potable water and sources in Florida.

Additional Comments
Report has a water quality section. Results of 30 Nasqan sites in Florida. Okeechobee, Glades and Highlands Counties. Data from S65E and Fisheating Creek near Palm Lakes, only in this area.

Hendry, C. D., P. L. Brezonik, and E. S. Edgerton. 1981. Atmospheric deposition of nitrogen and phosphorous in Florida. Pages 199-206 in S. J. Eisenreich, editor. Atmospheric Pollutants in Natural Waters. Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, USA.

Reference ID: 177

Keywords: Kissimmee Basin/Istokpoga Basin/ Okeechobee County/Osceola County/Highlands County/Orange County/Glades County/Polk County/Water quality/Nutrients/KCOL/Brad Jones/KCOL

Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
Study objectives included determination of atmospheric and fluxes of N and P to various geographic regions of Florida, determine the major forms of the nutrients in precipitation, to determine the seasonal variations in the nutrient content of rain, to examine the relative importance of dry fallout and wet deposition as sources of nutrients, to compare present concentrations and fluxes with historical data; and to examine the significance of atmospheric nutrient deposition relative to critical loading rates for lake eutrophication.

Study Conclusions
Atmospheric deposition of N ranged from 0.32 1.13 N/m^2 yr with statewide mean of 0.75 N/m^2 yr. Highest deposition was from predominantly agricultural sites while coastal and forests had the lowest. Wet only deposition is dominant mechanism for NH^4-N and NO^3-N, accounting for 81% and 61%, respectively of total. Dry fallout is more important Organic N (53%) of TON input. In both wet only and bulk precipitation, nitrogen was predominantly inorganic from with statewide average concentrations for TIN and TON of 0.38 mg/l (69% of TN) and 0.17 mg/l, respectively. Generally N concentrations were higher in summer than in winter. P deposition averaged 50 mg P/m^2 yr with highest deposition in predominantly agricultural sites and phosphorous mining areas. Lowest was in coastal and forested areas. Dryfall was dominant mechanism for P deposition, accounting for 80% of total organic P (85%) predominantly dryfall as well as SRP (73%). Inorganic P was dominant form of P in both bulk and wet only precipitation, comprising 65% of TP. Statewide atmospheric deposition rates of N and P are below the loading rates associated with water quality problems, but deposition rates of both N and P at several agricultural sites did "permissible" levels.

Additional Comments
Statewide precipitation monitoring network set up. 24 sites from Pensacola to Bahia Honda. Primarily N and P and loads.
Good N and P review of rainfall Over Florida.

Herb, W. R., and H. G. Stefan. 2004. Temperature stratification and mixing dynamics in a shallow lake with submersed macrophytes. Lake and Reservoir Management 20:296-308.

Reference ID: 624

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Herndon, A. Date unknown. Draft basin plan for Lake Kissimmee. U.S. Environmental Protection Agency, Atlanta, Georgia, USA.

Reference ID: 315

Keywords: Lake Kissimmee/Lake/Water Quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson **(date unknown)**

Higer, A. L., and M. C. Kolipinski. 1970. Sources of pesticides in Florida waters. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 178
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Okeechobee County/Osceola County/Highlands County/Orange County/Glades County/Polk County/Water quality/Nutrients/KCOL/Brad Jones/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

Brief Description of Study
The purpose of this report was to identify the types and quantities of pesticides used in Florida during 1966. The data was assembled so as to be available to meet the immediate needs of cooperating agencies for information for the proper management of public programs.

Study Conclusions
Pesticide usage was found greatest in areas of established and expanding agricultural activities, especially the central citrus belt and the north central and southern farming regions.~ $34.0x10^6$ lbs of chlorinated hydrocarbon, argonophosphate, carbonate and metals organic pesticides were used in 1966. Of this total, $25.6\ x10^6$ lbs were applied for the control of pesticides in citrus, vegetables, and melons. Lesser amounts on other crops, towns, homes and mosquito control.

Additional Comments
Since statewide data was not abundant during the period of this report, Dade County data (being most abundant) was used as a basis for several of the statewide estimates.

Highlands Soil Conservation District. 1955. Watershed work plan for Lake Placid- East Chain of Lakes watershed. U.S. Department of Agriculture, Soil Conservation Service, Spartanbury, South Carolina, USA.
Reference ID: 179
Keywords: Lake Placid/Nurients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

____. 1959. Work plan for upper Josephine Jackson Creek Watershed. U.S. Department of Agriculture, Soil Conservation Service, Spartanbury, South Carolina, USA.
Reference ID: 180
Keywords: Josephin Jackson Creek/Watershed/ Work plan/Brad Jones/KCOL
Notes: Brent Anderson

Holcomb, D. E. 1969. Annual progress report for investigation project- water quality study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 182
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Butler lake/East Lake Tohopekaliga/Lake Francis/Marion Lake/Reedy Lake/Lake Rosalie/Star Lake/Lake Tibet/Lake Tohopekaliga/Underhill Lake/Wales Lake/Osceola County/Highlands County/Orange County/Osceola County/Polk County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
The objective of the study is to document water quality in Florida lakes to establish background data which will enable biologists to understand rates of water quality change and to predict water changes to eventually use to evaluate the effects of pollution.

Study Conclusions
Discussion of 3 intensively sampled lakes (outside of District) given.

Additional Comments

Fall and spring sampling, biannually, modified depth composite sampling. Lakes chemistry data tabularized for a range of variables some as previous reported. Lake ranking also available. Lake descriptions also available.

____. 1967. Annual progress report for research project- water quality study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 316
Keywords: Water quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson

____. 1968. Annual progress report for research project- water quality study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 181
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Crooked Lake/Lake Istokpoga/Lake Jackson/Lake June-in-Winter/Lake Kissimmee/Lake Letta/Lake Okeechobee/Reedy Lake/Okeechobee County/Osceola County/Highlands County/Orange County/Osceola County/Polk County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study

The objective of the study is to establish background quality information for some lakes in Florida which are important recreational fishing lakes.

Study Conclusions

Semi-annual mid-lake sampling is adequate to obtain general chemical information of a given water body. No discussion of the data except to assess method and suggest alternative methods to further understand data.

Additional Comments

Quality measurements made semi-annually at a single mid-lake station for 50 lakes and at several stations more frequently for 5 lakes. (Fall and spring sampling). Modified depth composite sampling. Good physical description of each lake and location of STP's in some cases. Raw data for each lake is tabularized. Contains physical, nutrient, metals,
Tannin and lignin, and major constituent data. Some algae information and lake rankings according to organic N and turbidity.

Holcomb, D. E., and C. Starling. 1973. Final completion report- water quality investigations. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 183
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Butler lake/East Lake Tohopekaliga/Lake Francis/Marion Lake/Reedy Lake/Lake Rosalie/Star Lake/Lake Tibet/Lake Tohopekaliga/Underhill Lake/Wales Lake/Osceola County/Highlands County/Orange County/Osceola County/Polk County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study

Objectives generally reduced to maintaining water quality for selected Florida Lakes and document water quality changes.

Study Conclusions

Discussion generally restricted, as was the use in the previous reports, to intensive sampling of lakes outside District.

Additional Comments

Semi-annual sampling. Tabular data ranking of turbidity, chlorophyll a, PON, raw data in table for lakes

inside district.

Holcomb, D. E., and W. Wegener. 1972. Annual progress report- water level manipulation, Lake Tohopekaliga drawdown. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 184
Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/St. Cloud Canal/C-31/Southport Canal/C-35/Shingle Creek/Partin Canal/Orange County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Objectives were to determine the effects of a drawdown on water quality in Lake Tohopekaliga and to document pollution sources. 11 stations sampled.

Study Conclusions
Most constituents measured increased in concentration during the drawdown phase, with a corresponding reduction as re-inundation progressed. A concentration gradient was evident, highest in the north end of the lake where major pollution sources enter, lowest in the south end. Annually, the combined effluent from 5 sewage treatment plants discharges 283,047 338,056 pounds of elemental N and 517,498 641,562 pounds of P to Lake Tohopekaliga and its tributaries. A large %is in a form immediately available for bio assimilation and expression. We consider this collective effluent to be the predominant factor for accelerating the degradation of Lake Tohopekaliga at the present time.

Additional Comments
Raw data plus average range of data. Documents inflow areas and pollution sources. Good documentation of nutrient levels, sources, locations for sampling programs, etc. Also contains average effluent analysis from 5 sewage plants.

____. 1973. Annual progress report- water level manipulation, Lake Tohopekaliga drawdown. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 185
Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/St. Cloud Canal/C-31/Southport Canal/C-35/Shingle Creek/Partin Canal/Judges Canal/Orange County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Compilation of ongoing projects concerned with the Lake Tohopekaliga drawdown. The objectives of the chemical studies was to determine the effects of drawdown on water quality in Lake Tohopekaliga and to document pollution sources.

Study Conclusions
In general, concentrations of most parameters measured have declined from peaks exhibited during the period of lake drawdown, but remained higher than pre-drawdown concentrations. Between February 1972 January, 1973, 5 sewage plants have discharged an estimated 415,550 pounds of elemental N and 576,577 pounds of P to the Lake Tohopekaliga tributaries. The change in water quality observed since the initiation of this study made it obvious that any long term improvement in the lake requires complete removal of the large and ever increasing volume of sewage being discharged to it.

Additional Comments
Raw data available

____. 1974. Completion report- Lake Tohpekaliga drawdown study. Florida Game and Freshwater Fish Commission, Tallahassee, Florida, USA.
Reference ID: 186
Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/Osceola County/Water quality/Nutrients/KCOL/ Brad Jones

Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
The purpose of this study was two fold: to summarize information obtained during the Lake Tohopekaliga drawdown study and to submit recommendations pertaining to water level fluctuations.

Study Conclusions
The drawdown was not accompanied by an improvement in water quality. A major factor responsible for deteriorating water quality is the discharge of sewage wastes in to the lake. This discharge has increased from 9 to 14 million gallons/day over the study duration.80% of the wastes are contributed by 2 plants in greater metropolitan Orlando. Most constituents increased in concentrations during the drawdown. Decreases occurred as re-inundation progressed but remained higher than before drawdown. Highest nutrients occurred in the north end, lowest in south. By 1974, this clear gradient had begun to shift with highest concentrations of major cat ions and organic N compounds shifting to south end. Water quality did not improve following the drawdown. Sewage plant discharges into Lake Tohopekaliga increased 51.9% from 71-74 for nearly 5 billion gallons annually. At the present rate over 300 tons of elemental N and 670 tons of P are discharged to the lake annually.

Additional Comments
Raw data available

Holcomb, D. E., and W. L. Wegener. 1972. Hydrophytic changes related to lake fluctuation as measured by point transects. Pages 570-583 in J. W. Webb, editor. Proceedings of the Twenty-fifth Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners, Charleston, South Carolina, USA.
Reference ID: 338
Keywords: Lake Tohopekaliga/Vegetation/Drawdown/Laura Carnal/KCOL
Notes: Recorded by Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?
This study provides vegetation data for Lake Toho during a natural (reference) and a regulated drawdown. Species and elevation of occurrence is documented.

What parameters were monitored?
Species occurring in transects, percent encountered, elevation encountered

What was the geographic extent of monitoring?
Lake Toho east and west shores.

How many samples or sample locations were monitored?
Ten transects, three different years (1956, 1970, 1971).

What was the sampling frequency and duration (period of record)?
Once for each of the sample years.

Do these data cover the baseline or reference (pre-1960s) period?
Yes, data from Sincock (1956) is compared to the data found in this study.

Who collected the data?
Fish and Game Commission

Where are the data located? (agency or organization maintaining database)
In report and possibly in Kissimmee or Orlando field office

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Not sure, plants were identified using four references.

Are raw data and/or summarized data presented in the document?
Some raw, mostly summarized.

Is a summary of findings presented in the document?
Yes, good discussion and conclusions.

Holcomb, D. E., and W. L. Wegener. 1974. Response of floodplain vegetation to lake fluctuation. Page Appendix F in D. E. Holcomb and W. L. Wegener, editors. Extreme lake drawdown: A working fish management technique. Florida Game and Fresh Water Fish Commission, Fisheries and Research Lab. Water level manipulation project F-29-R.

Holle, R. L. 1971. Effects of cloud condensation nuclei due to fires and surface sources during South Florida droughts. Journal of Applied Meteorology 10:62-69.
Reference ID: 187
Keywords: Fires /Drought/Droughts/Fire/Brad Jones/KCOL
Notes: Brent Anderson

Horsburgh, C. A. 1999. Lake regions of Florida: Water chemistry and aquatic macrophyte data. M.S. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 420
Keywords: KCOL/Brad Jones/Vegetation

Hoyer, M. V., C. D. Brown, and D. E. Canfield, Jr. 2004. Relations between water chemistry and water quality as defined by lake users in Florida. Lake and Reservoir Management 20:240-248.
Reference ID: 622
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Hoyer, M. V., and D. E. Canfield, Jr. 2001. Aquatic vegetation and fisheries management. LakeLine 21:20-22.
Reference ID: 561
Keywords: Vegetation
Abstract: Aquatic vegetation is reported as beneficial to fish populations throughout the primary literature for many reasons. Vegetation provides habitat for a host of macro-invertebrates, stabilizes sediment, produces oxygen, and provides spawning substrate as well as refuge for prey and predator species alike. Individual lakes have the ability to maintain a certain abundance of aquatic vegetation. Abundance is determined in part by: (1) lake trophic status and water chemistry, (2) light availability, (3) substrate characteristics, and (4) lake morphology (shape, depth, etc.). These environmental factors can act independently or in concert. Changes in vegetative abundance can occur naturally due to factors such as water level fluctuation. Changes can also occur due to aquatic plant management programs.

____. 1994. Bird abundance and species richness on Florida lakes: Influence of trophic status, lake morphology, and aquatic macrophytes. Hydrobiologia 279-280:107-119.
Reference ID: 566
Notes: Also published in book (Aquatic birds in the trophic web of lakes, Sackville, NB, Canada, Aug 1991. Kerekes, JJ(ed)
Abstract: Data from 46 Florida lakes were used to examine relationships between bird abundance (numbers and biomass) and species richness, and lake trophic status, lake morphology and aquatic macrophyte abundance. Average annual bird numbers ranged from 7 to 800 birds/km super(2) and bird biomass ranged from 1 to 465 kg/km super(2). Total species richness ranged from 1 to 30 species per lake. Annual average bird numbers

and biomass were positively correlated to lake trophic status as assessed by total phosphorus (r = 0.61), total nitrogen (r = 0.60) and chlorophyll a (r = 0.56) concentrations. Species richness was positively correlated to lake area (r = 0.86) and trophic status (r = 0.64 for total phosphorus concentrations). The percentage of the total annual phosphorus load contributed to 14 Florida lakes by bird populations was low averaging 2.4%. Bird populations using Florida lakes, therefore, do not significantly impact the trophic status of the lakes under natural situations, but lake trophic status is a major factor influencing bird abundance and species richness on lakes. Bird abundance and species richness were not significantly correlated to other lake morphology or aquatic macrophyte parameters after the effects of lake area and trophic status were accounted for using stepwise multiple regression. The lack of significant relations between annual average bird abundance and species richness and macrophyte abundance seems to be related to changes in bird species composition. Bird abundance and species richness remain relatively stable as macrophyte abundance increases, but birds that use open-water habitats (e.g., double-crested cormorant, Phalacrocorax auritus) are replaced by species that use macrophyte communities (e.g., ring-necked duck, Aythya collaris).

____. 1996. Largemouth bass abundance and aquatic vegetation in Florida lakes: An emperical analysis. Journal of Aquatic Plant Management 34:23-32.

Reference ID: 565

Keywords: Fish/Vegetation/Nutrients/Lawrence Glenn/Brad Jones

Abstract: Data from 56 Florida lakes were examined for relationships between abundance of aquatic macrophytes and young-of-the-year (< 160 mm TL), subadult (161 - 240 mm TL) and adult (>250 mm TL), largemouth bass (Micropterus salmoides). Study lakes ranged from 2 ha to 271 ha. Trophic status ranged from oligotrophic to hypereutrophic. The percentage of lake area covered (PAC) and the percentage of lake volume infested (PVI) with aquatic macrophytes among the lakes ranged from <1% to 100%. Young-of-the-year largemouth bass abundance ranged from 0 to 5857 fish/ha. Subadult largemouth bass abundance ranged from 0 to 216 fish/ha and adult largemouth bass abundance ranged from 1 fish/ha to 75 fish/ha. There were weakly significant, direct relationships among lakes between measures of macrophyte abundance and estimates of young-of-the-year and subadult abundance. There were weakly significant inverse relationships among lakes between measures of macrophyte abundance and growth (mm/day) of age-1 and age-2 largemouth bass. There were no significant relationships among lakes between measures of macrophyte abundance and estimates of adult largemouth bass abundance or standing crop (kg/ha). Adult largemouth bass abundance and standing crop were positively correlated to lake trophic status. After accounting for lake trophic status, the abundance of young-of-the-year largemouth bass was directly related to PVI, and age-1 growth rate was inversely related to PVI but there were no significant relationships between macrophyte abundance and the abundance of subadult and adult largemouth bass. There are no strong predictable relationships between the abundance of aquatic macrophytes and the abundance of adult largemouth bass among Florida lakes < 300 ha.

____. 1994. Largemouth bass populations and aquatic vegetation in Florida lakes. Lake and Reservoir Management 9:83.

Reference ID: 567

Keywords: Fish/Vegetation

Abstract: Data from 59 Florida lakes (primarily with surface areas < 300 ha) were used to examine the relationships between aquatic macrophytes and largemouth bass (Micropterus salmoides) populations. The lakes ranged from oligotrophic to hypereutrophic and from 0 to 100% covered with aquatic macrophytes. We tested four hypotheses with the following results 1) aquatic macrophyte abundance was positively related to the number YOY largemouth bass among lakes; 2) aquatic macrophyte abundance was positively but weakly related to the number of largemouth bass recruits among lakes; 3) aquatic macrophyte abundance was negatively related to growth rates of age 1 but not age 2 largemouth bass among lakes; and 4) aquatic macrophyte abundance was not related to the stock and standing crop of harvestable largemouth bass among lakes. It was hypothesized that lakes with abundant aquatic macrophytes yield large numbers of YOY largemouth bass and largemouth bass recruits, but that the mortality rates of these fish probably exceed those of fish in low macrophyte lakes. The result is a harvestable largemouth bass stock and standing crop, which is determined primarily by the trophic status of the lake, regardless of the abundance of aquatic macrophytes. It is suggested that further research on the relation between aquatic macrophytes and largemouth bass be conducted in large lakes (>300 ha).

____. 1990. Limnological factors influencing bird abundance and species richness on Florida lakes. Lake and Reservoir Management 6:133-142.

Reference ID: 596

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Hoyer, M. V., J. Winn, and D. E. Canfield, Jr. 2001. Citizen monitoring of aquatic bird populations using a Florida lake. Journal of Lake and Reservoir Management 17:82-89.

Reference ID: 424

Keywords: KCOL/Brad Jones

Hoyer, M. V., C. D. Brown, and D. E. Canfield, Jr. 2004. Relations between water chemistry and water quality as defined by lake users in Florida. Lake and Reservoir Management 20:240-248.

Reference ID: 421

Keywords: KCOL/Brad Jones

Hoyer, M. V., D. E. Canfield, Jr., and R. W. Bachmann. 2002. Evaluation if Lake Tohopekaliga habitat enhancement project proposal. Unpublished report on file in Gainesville, Florida, USA.

Huber, H. C., J. P. Heaney, P. B. Bedient, and J. P. Bowden. 1976. Environmental resources management studies in the Kissimmee River basin. Final Report. University of Florida, Department of Environmental Engineering Sciences, Gainesville, Florida, USA.

Reference ID: 426

Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/Kissimmee River/Cypress Lake/Lake Kissimmee/Oak Creek/Maple River/Ice Cream Slough/Chandler Slough/Blanket Bay Slough/Yates Marsh/Pine Island Slough/Orange County/Glades County/Highlands County/Okeechobee County/Polk County/Osceola County/Water quality/Nutrients/KCOL/ Brad Jones

Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study

The study describes the transition of the Kissimmee River Basin from natural vegetation status with low intensity agriculture to one increasingly characterized by intensive agriculture and urbanization with

associated water quality problems due primarily by drainage practices. The channelization of the lower Kissimmee River and other flood control and water management projects of the 60's are discussed.

Study Conclusions
Water quality, as illustrated by concentrations of total P, is shown to decrease as drainage density increases. Increased surface loadings due to fertilization and cattle are also a factor.

Additional Comments
Water quality summaries related mainly to trends with specific quality data presented in tabular or figure format only.

Huber, W. C., K. Maalel, E. Foufoula, and J. P. Heaney. 1982. Long-term rainfall/runoff relationships in the Kissimmee River basin. Final Report to the South Florida Water Management District. University of Florida, Department of Environmental Engineering Sciences, Gainesville, Florida, USA.
Reference ID: 425
Keywords: KCOL/Brad Jones

Huges, G. H., and J. M. Frazee, Jr. 1979. Surface-water features in Osceola County and adjacent areas. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 189
Keywords: LTMP/Kissimmee Basin/Childs Lake/Alligator Lake/Lake Tohopekaliga/Lake Kissimmee/Marion Lake/Lake Rosalie/Lake Marian/Lake Weohyakapka/Jane Green Creek/Catfish Creek/Kissimmee River/Reedy Creek/Shingle Creek/Boggy Creek/Orange County/Glades County/Highlands County/Okeechobee County/Polk County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Objective is to acquaint the reader with the principal surface water features of Osceola County and adjacent areas, to compile some of the pertinent hydrologic data.

Study Conclusions
Dissolved solids ranged from about 25 to 240 mg/L. Alligator lake ranged from 25 to 65 mg/L. For most lakes and streams, the fluctuation was seasonal. The concentration is least with surface runoff is from rainfall and greatest in lakes often evaporation concentration of minerals or in streams when flow is mostly groundwater. Water is Osceola County in mostly CA-bicarbonate. Color is high in some of the water (max of 400 for Reedy Creek) and is due to presence of humic acids. (occurrence due to swamps where soil is high in organics resulting from decomposition of plant materials). The higher biocarbonate concentrations of water in Shingle Creek and Lake Tohopekaliga probably reflects the addition of effluent STP's and irrigation water which includes water from Florida Aquifer. Most water ranged from pH 6-8.

Additional Comments
Osceola contains 878 named and unnamed lakes 10 acres or more in area. Report includes major lakes surface areas, yearly rainfall at Lake Kissimmee, stream discharges with drainage areas and ET data.

Hulon, M., J. Furukawas, J. Buntz, J. Sweatman, and C. Michael. 1998. Lake Jackson Wildlife Islands. Aquatics 20:4-9.
Reference ID: 331
Keywords: Macroinvertebrates/Joe Koebel/KCOL/Lawrence Glenn /Fish
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?

Provides data on amphibian and reptile species richness on wildlife islands in Lake Jackson, Osceola County, Florida.

What parameters were monitored?

Amphibian and reptile species richness.

What was the geographic extent of monitoring?

Lake Jackson, Osceola County, Florida

How many samples or sample locations were monitored?

Two "T"-shaped, 33' long silt fence arrays with pitfall and funnel traps were established on each of two wildlife islands. Each array had six single funnel and three double funnel traps. Each array also had six pitfall traps (buried 5-gal bucket) arranged at different locations along the legs of the array. Visual observations of amphibians and reptiles also were made during each sampling trip.

What was the sampling frequency and duration (period of record)?

Sampling occurred quarterly (March, June, September, and December) from September 1994 through June 1997 for a 30-day period each quarter.

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

FGFWFC (FFWCC)

Where are the data located? (agency or organization maintaining database)

FFWCC, Kissimmee, Florida

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Unknown

Are raw data and/or summarized data presented in the document?

No.

Is a summary of findings presented in the document?

Yes, briefly. A list of amphibian (9) and reptile (19) species trapped or observed on the wildlife islands also is presented.

Comments: This study simply presents a list of amphibian and reptile taxa trapped or observed on wildlife islands. Data is likely of little value for developing performance measures for amphibian and reptile species richness, diversity, or relative abundance.

J.W. Koebel Jr. 2/14/2005

Hulon, M. W. 1994. Restoring Lake Jackson, Osceola County, Florida. Lake and Reservoir Management 9:83.
Reference ID: 554

Keywords: Lake Jackson/Muck/Vegetation

Abstract: Lake Jackson (1,020 acres), located in Osceola County, was overdrained by

man-made canals in the mid-1950's to allow for agriculture activities. Water levels decreased dramatically and annual fluctuation was severely restricted. During the past 30 years aquatic plant communities have continued to increase in density forming monocultures of pickerelweed (Pontederia cordata), duck-potato (Sagittaria lancifolia) and cattails (Typha spp). Organic substrate two to three feet deep, comprised of dead and decaying plant material has built-up on the lake bottom and eliminated productive fisheries habitat. The goal of this restoration project is to restore desirable aquatic habitat and reestablish a quality sport fishery in Lake Jackson. Restoration activities include: building a water control structure ($650,000), degrading and backfilling 10,000 ft of levees and canals ($250,000), conducting a muck removal operation on 32,000 ft of shoreline ($1,000,000) and aquatic plant management ($100,000).

Hulon, M. W., E. J. Moyer, R. S. Butler, and R. W. Hujik. 1992. Aquatic plant community response (percent composition and biomass estimates) to the 1990 estreme drawdown, muck removal and discing project on East Lake Tohopekaliga, Florida. Abstracts of the Aquatic Plant Management Society, 32nd Annual Meeting and International Symposium for Biology and Management of Aquatic Plants.
Reference ID: 517
Keywords: East Lake Tohopekaliga/Vegetation

Hulon, M. W., E. J. Moyer, R. S. Butler, and V. P. Williams. 1992. Aquatic plant response to the 1987 extreme drawdown/Muck removal project on Lake Tohopekaliga. Aquatics 14:18-21.
Reference ID: 516
Keywords: Lake Tohopegaliga/Vegetation/Muck removal

Hulon, M. W., J. Buntz, A. F. Landrum, C. K. McDaniel, C. Michael, D. C. Arwood, T. Penfield, A. C. Jasent, A. L. Egbert, and E. J. Moyer. 2000. Completion report for Kissimmee chain of lakes. Study 6301: Lakes Cypress and Hatchineha. State of Florida Fish and Wildlife Conservation, Tallahassee, Florida, USA.
Reference ID: 374
Keywords: KCOL/Fish/Lawrence Glenn/Lake Cypress/Lake Hatchineha/Vegetation
Notes: Recorded by Brent Anderson 4/4/2005

Hurst, W. 1976. Management plan for upland retention in the Kissimmee River Basin. Alachua County Pollution Control, Tallahassee, Florida, USA.
Reference ID: 190
Keywords: LTMP/Kissimmee Basin/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Paper presented at a joint meeting if project participants in Gainesville in August 1975.

Study Conclusions
Listed previous studies documenting water quality benefits from an implementation of an upland retention scheme to detain runoff and convert more surface flow to subsurface flow. Implementation of the proposed upland retention scheme should enhance the quality of water in the basin and overall quality of run-off ultimately entering Lake Okeechobee.

Additional Comments
No data at all, some thoughts and benefits derived from other report conclusions abridged here. No specific county involved and no specific resource.

Hutchinson, C., D. D. Walder, S. E. Gatewood, and R. MacGill. 1976. Final report on the management plan for upland retention in the Kissimmee River Basin (Draft). Florida Department of Administration, Division of

State Planning, Bureau of Comprehensive Planning, Tallahassee, Florida, USA.

Reference ID: 191

Keywords: LTMP/Kissimmee Basin/Orange County/Osceola County/Polk County/Highlands County/Okeechobee County/Water quality/Nutrients/KCOL/ Brad Jones

Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study

Report places into perspective the historical activities leading up to the need for this report and the eutrophication of Lake Okeechobee and well as the State Government's moves to confront the problem. There follows a discussion of each management basin's problem and solutions followed by recommendations for implementation, costs and benefits, and an outline of remaining work for the completion and implementation of the special project.

Study Conclusions

(Taylor Creek-Nubbins Slough) Cattle waste, especially from dairies major source of nutrients from basin.100,000 cattle can contribute about 10,000 tons of N and 2,000 tons of P to land. Of total, 213 tons of P and 561 tons of N transported to Lake Okeechobee. Taylor Creek-Nubbin Slough contributes the largest P loads to Lake Okeechobee. The P sources are (1) intensively ditched improved pasture, (2) potential loading from dairy barns, (3) intensive crop land, (4) Beef cattle production on semi-improved Pasture and native range. Otter Creek, Mosquito Creek and Canal L-65 contribute high levels of nutrient loads. (Kissimmee Valley) While some of the nutrient loads form the Kissimmee River valley is derived from fertilization of improved pasture the primary source of high P loads delivered to C-38 and Lake Okeechobee is cattle waste which washes off land and is transported downstream by rapid drainage. Nutrient generation and transport is especially significant where cattle numbers are high and the area is extensively detailed and manure is concentrated at dairies and similar operations. Most of the nutrients carried by C-38 are produced in the lower Kissimmee Valley. The portion below the mid-point of pool C of C-38 produces a disproportionate high P load when compared with the rest of the lower valley. Sewage plants of Orlando, other smaller plants, and septic tanks discharge 2.5 million pounds of N and 1.5 million pounds of P each year. Of this, total 1.8 million pounds of N and 90,000 pounds of P are discharged directly to upper Kissimmee Chain of Lakes. Shingle and Boggy Creeks transport 72% of all N and P discharges to surface waters by sewage treatment plants. Constant and intense sewage loads has caused severe hypereutrophication of Lake Tohopekaliga and has degraded water quality through the Kissimmee Upper Cain of Lakes (Lake Istokpoga) water quality in the Lake Istokpoga basin has deteriorated greatly over the past 5 years and now contributes significantly to the eutrophication of Lake Okeechobee and has increased disproportionately to amount of water leaving. The Upper Basin upstream from southern lake Istokpoga does not appear to contribute significant nutrient loads while lower basin produces large nutrient levels. Greater pasture land, especially improved pasture, high drainage and cattle density has resulted in greater P levels. High N concentrations are the probable result of much soil drainage for pasture, citrus and vegetables (Fish eating Creek). The resultant drainage and land use practices in the Fish Eating Creek marsh area generate large quantities of nutrients; however, natural wetlands remaining along the middle reach assimilate much of the large nutrient load. Fish eating Creek does not presently represent a significant water quality problem to Lake Okeechobee.

Additional Comments

No raw data

Irwin, G. A., and H. G. Healy. 1976. Chemical and physical quality of selected public water supplies in Florida, August-September, 1976. U.S. Geological Survey, Tallahassee, Florida.

Reference ID: 192

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Lake Placid/Kissimmee River/Okeechobee County/Osceola County/Highlands County/Orange County/Glades County/Polk County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study

The USGS and Florida Department of Environmental Regulation made a water quality reconnaissance of

127 treated and untreated public water supplies to determine background concentrations of NO3, F, turbidity, trace elements and pesticides.

Study Conclusions
Results indicate with few exceptions, virtually all major public water supplies in Florida are of high quality, meet the standards set fourth in the National Interim Primary Drinking Water Regulations. Occasionally the concentrations of F, turbidity, Cd, Cr and Pb would equal or exceed maximum contamination level however infrequently.

Additional Comments
Surface water sources sampled mainly central and south Florida. Data on Lake Placid, (Kissimmee River), Okeechobee (Taylor Creek.)

Irwin, G. A., and R. T. Kirkland. 1980. Chemical and physical characteristics of precipitation at selected sites in Florida, USA. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 193
Keywords: Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

James, R. T., K. M. O'Dell, and B. L. Jones. 1993. Water quality improvements of Lake Tohopekaliga in response to lake management. Pages 26-37 in C. E. Watkins, H. McGinnis, and K. J. Hatcher, editors. Proceedings of the Southeastern Lakes Management Confrence, The benefits of Lake and Reservoir Management. North American Lake Management Society, Alachua, Florida, USA.
Reference ID: 428
Keywords: Brad Jones/KCOL

James, R. T., K. M. O'Dell, and V. H. Smith. 1994. Water quality trends in Lake Tohopekaliga, Florida, USA: responses to watershed management. Water Resources Bulletin 30:531-546.
Reference ID: 429
Keywords: Brad Jones/KCOL
Notes: Recorded by Brent Anderson 5/4/2005
Abstract: Water quality in eutrophic Lake Tohopekaliga, Florida, improved markedly from 1982 to 1992 as a result of reductions in phosphorus and nitrogen loading to the lake. Annual budgets of water, chloride, phosphorus and nitrogen were constructed for the lake, and indicate it is a sink for phosphorus and a source for nitrogen. Water column concentrations of total phosphorus concentrations of total phosphorus, soluble reactive phosphorus, total nitrogen, dissolved inorganic nitrogen, and chlorophyll a all declined as external inputs of nutrients decreased. Water column nitrogen:phosphorus ratios have increased, suggesting a probable shift from nitrogen to phosphorus limitation. This apparent shift in nutrient limitation status also is supported by comparison of the mean Trophic State Indices for phosphorus, nitrogen, and chlorophyll a. These improvements in water quality are attributed to the diversion of wastewater treatment plant effluent from the lake, and the increased use of retention ponds for stormwater runoff.

James, W. F., and J. W. Barko. 1994. Macrophyte influences on sediment resuspension and export in a shallow impoundment. Lake and Reservoir Management 10:95-102.
Reference ID: 592
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Jennings, M. J., E. E. Emmons, G. R. Hatzenbeler , C. Edwards, and M. A. Bozek. 2003. Is littoral habitat affected by residential development and land use in watersheds of Wisconsin? Lake and Reservoir Management 19:272-279.
Reference ID: 617
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Johnston Engineers, Inc. 1975. Kissimmee- St. Cloud Osceola County 201 Facilities Plan (Draft). Johnston Engineers, Inc., Kissimmee, Florida, USA.
Reference ID: 194
Keywords: LTMP/Kissimmee Basin/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
The primary objective of this work was to provide for cost effective, environmentally sound and implementable treatment works which will meet applicable requirements of 201

Study Conclusions
Conclusions, recommendations contain no quality assessment as much as a review of necessary facilities to meet current quality standards. In general water quality is excellent near recharge areas and deteriorates in proportion to the distance there from. Solids vary from 100ppm in Osceola County to > 1000ppm along St. Johns. Chloride concentrations vary from < 10ppm in N.W. to > 1000ppm along the St. Johns. Deeper wells more mineralized and harder.

Additional Comments
Report includes a list of facilities holding a current NPDES permit. Lists all point source polluters, contains general soils map. Report has a water quality section but surface water has no data, ground water has no data, non-artesian (some general statements) shallow artesian- no data available, Florida Aquifer- some data, Presently 34 waste water point sources in Planning Area, but only > 0.1 MGD.

Jones, B. L., P. S. Millar, T. H. Miller, D. R. Swift, and A. C. Federico. 1983. Preliminary water quality and trophic state assessment of the Upper Kissimmee Chain of Lakes, Florida, 1981-1982. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Jones, B. L. 1982. Lake Okeechobee water quality April 1980 to March 1981. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

Jones, J. R., and R. W. Bachmann. 1978. Trophic status of Iowa lakes in relation to origin and glacial geology. Hydrobioligia 57:267-273.
Reference ID: 422
Keywords: KCOL/Brad Jones

Jones, J. R., M. F. Knowlton, and K. G. An. 2003. Trophic state, seasonal patterns and empirical models in South Korean reservoirs. Lake and Reservoir Management 19:64-78.
Reference ID: 612
Keywords: Brad Jones/Water quality/Korea/Trophic state/Monsoon/Nutrients/Chlorophyll/Transparency/Seasonal patterns
Notes: Recorded by Brent Anderson 6/02/2005
Abstract: Data from 59 reservoirs in South Korea, sampled monthly during 1993-2000, showed that about one-third were mesotrophic, nearly one-half were eutrophic and the remainder were hypereutrophic based on conventional criteria for total phosphorus (TP), chlorophyll (Chl) and Secchi depth. Most reservoirs had >1 $mg \cdot L^{-1}$ total nitrogen (TN) resulting in high mass ratios of TN:TP (range 23 to 243, median 76) relative to many temperate lakes. To compensate, conventional TN criteria were provisionally adjusted upward by about 2.5-times to classify Korean reservoirs uniformly across all trophic state metrics. During the summer monsoon, TP and TN typically peaked in mesotrophic reservoirs and declined in the hypereutrophic group. The inference is that monsoon inflow produces these patterns by increasing non-point external inputs that dominate the nutrient budgets of mesotrophic reservoirs while diluting point-source inputs important in hypereutrophic impoundments. Eutrophic reservoirs showed both response patterns, so that taken in aggregate a seasonal response was not apparent. The log relation between Chl and TP was linear and showed an average yield of Chl per unit of TP on par with other temperate takes. Seasonally, the Chl-TP relation was strongest during summer and weaker during fall-winter which is consistent with increased light-limitation during mixis in these monomictic impoundments. Seasonal development of Chl did not show strong evidence of a spring or fall bloom. About half of the time maximum Chl values were measured

during the monsoon or post-monsoon (July-September). Maximum Chl was ~3 times the annual mean and during summer maximum Chl was ~double the mean. The log relation between Chl and Secchi depth matched that found in North American lakes and the seasonal phenology for Secchi depth was the opposite of Chl and suspended solids. The analysis confirms that the monsoon is a major source of variation within and among Korean reservoirs.

Jones, R. A., and G. F. Lee. 1978. An approach for the evaluation of the efficiency of wetlands based phosphorous control programs on downstream water quality. Pages 217-242 in M. A. Drew, editor. Proceedings of a symposium sponsored by the coordinating council on the restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basin. Coordinating council on the restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basin, Tallahassee, Florida, USA.
Reference ID: 196
Keywords: Kissimmee River Valley/Kissimmee River/Taylor Creek/Nubbin Slough/Brad Jones/KCOL/Phosphorus assimilation
Notes: Brent Anderson

Jones, S. A. 2003. Managing recreational use on the Yahara Lakes. Lake and Reservoir Management 19:35-44.
Reference ID: 610
Keywords: Brad Jones/Water quality/Yahara River/Water recreation management/Boating regulations/Boater educationUser conflicts/Dane County/Dane County Lakes and Watershed Commission/Wisconsin
Notes: Recorded by Brent Anderson 6/02/2005
Abstract: Conflict between water recreation users is a universal problem that is likely to become worse. Dane County, located in southern Wisconsin, has experienced growth in recreational use and increased perception of user conflict that mirror national trends, The Yahara River chain of lakes includes the County's four largest lakes, which provide more than 7400 ha (18,000 acres) of water easily accessible to residents of this, the fastest growing county in Wisconsin. This paper describes and evaluates Dane County's experiences with, and strategies for balancing the interests of increasing number of different activities using the same resources.

Users have identified wakes from other boats, lack of courtesy, excessive speed, crowding and inconsiderate behavior as problems. Dane County's recreation management efforts described in the paper include a 200-ft (61 m) slow-no-wake regulation, coupled with state boating safety and equipment rules. Educational initiatives include formal boater safety education classes, and outreach materials and maps developed by the Dane County Lakes and Watershed Commission. Future management efforts need to solicit input from all types of recreational users, focus educational efforts on recreational use impacts on aquatic ecosystems as well as the regulations themselves, and use a deliberate planning process that could resolve recreational conflicts and bring about balanced resource use.

Joyner, B. F. 1971. Appraisal of chemical and biological conditions of Lake Okeechobee, Florida, 1969-1970. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 197
Keywords: LTMP/Kissimmee Basin/Kissimmee River/Taylor Creek/Glades County/Okeechobee County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Purpose of this report was to define the condition of Lake Okeechobee with respect to its state of eutrophication and to provide needed baseline data from which water management decisions can be made. Chemical, physical and biological properties were investigated.

Study Conclusions
Water from Kissimmee River and rainfall each contribute about 10% of the inflow; the Kissimmee River contributed about 1/3 of the dissolved solids. The nitrogen budget for Lake Okeechobee from January 1, 1969 to January 31, 1970 was about 9000 tons 41% and 25 % were contributed by the Kissimmee River

and rainfall. Organic nitrogen was the predominate form of nitrogen. 60% of all inorganic nitrogen was NH4.

Additional Comments
No raw data

____. 1974. Chemical and biological conditions of Lake Okeechobee, Florida. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 199

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Harney Pond/C-41/Nubbin Slough/Fisheating Creek/Indian Prairie Canal/C-40/Kissimmee River/Taylor Creek/Glades County/Okeechobee County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
The USGS in cooperation with the C and S FCD over a 41 month period between 1969-1972 assessed the source and status of enrichment of the lake system and established a baseline for managing water and quality. Objectives were (1) to determine the source and quantities of dissolved mineral matter and nutrients entering and leaving the lake, (2) determine the occurrence and distribution of N and P, trace elements selected by key biotic factors, and selected physical and chemical parameters pertaining to the lake, (3) define condition of lake with respect to present state of eutrophication.

Study Conclusions
Kissimmee River major source, 39% of total N, 36% of P loads-Taylor Creek 26% of total P load. In northern lake, phytoplankton increased to bloom levels and dominant species changed from green to blue-green after period of heavy abnormal inflow from tributaries and rainfall with consequent influx of nutrients to lake. Increases of P, Fe, organics relatively large after heavy run-off. After bloom, concentrations decreased. Dissolved solids in Taylor Creek was 605 mg/l, 2 times the lake level. Pesticide levels available, metals. Turbidity quality available. High color of Fisheating Creek due to organic materialfrom dense swamps. T-N load of Fisheating Creek = 2.0tons/day, mean 1.4 mg/l. Total P = .09 tons/day, mean 0.069 mg/l

Additional Comments
Report contains discharge record, water budget. Raw data available, loads available. Range of variables and loads.

____. 1973. Nitrogen, phosphorous, and trace elements in Florida surface waters, 1970-1971. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 198

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Fisheating Creek/Indian Prairie Canal/C-40/Kissimmee River/Lake Tohopekaliga/Taylor Creek/Glades County/Okeechobee County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/21/2005

Brief Description of Study
Purpose of this report was to summarize nitrogen, phosphorous, and trace-element data collected at selected stations on statewide lakes from Florida Surface water in 1970-71. Discussing the cause and effect relations and other significant features of the analysis is beyond the intent of the report. Its scope is linked to highlighting at least some of the results of the analyses of the samples from a selected statewide network.

Study Conclusions
Raw data only on select resources, no conclusions pertinent to the study area.

Additional Comments
No raw data

Joyner, B. F., W. F. Litcher, and W. Anderson. 1968. Water in Orange County, Florida, USA. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 200
Keywords: LTMP/Kissimmee Basin/Orange county/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
Public information leaflet

Study Conclusions
Water stored in the lakes and streams in Orange County is generally soft and low in mineral content, but is often highly colored due to dissolved organic matter.

Additional Comments
No data

Kan-Do Engineering, Inc. 1973. Water quality analysis and constraints on facilities development. Kan-Do Engineering, Inc., Winter Park, Florida,USA.
Reference ID: 201
Keywords: Water quality/Nutrients/Brad Jones/KCOL
Notes: Brent Anderson

Kaufman, M. I. 1972. The chemical types of water in Florida streams. (Map). U.S. Department of the Interior, Geological Survey.

____. 1969. Color of water in Florida streams and canals. (Map). U.S. Department of the Interior, Geological Survey.

____. 1969. Generalized distribution and concentration of orthophosphate in Florida streams. (Map). U.S. Department of the Interior, Geological Survey.

____. 1970. The pH of water in Florida streams and canals. (Map). U.S. Department of the Interior, Geological Survey.

Kaufman, M. I., and J. E. Dysart. 1987. Nitrogen, phosphorous, organic carbon, and biochemical oxygen demand in Florida surface waters, 1972. U.S. Department of the Inerior, Geological Survey, Tallahassee, Fllorida, USA.
Reference ID: 206
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Kissimmee River/Taylor Creek/Fisheating Creek/Indian Prairie Canal/C-40/Lake Tohopekaliga/Lake Kissimmee/Highlands County/Okeechobee County/Polk County/Osceola County/Glades County/Water quality/Indian Prairie Canal/C-40)/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
Water samples were collected during spring and autumn 1972 from about 100 surface-water sites in Florida. Samples were analyzed for plant nutrients, nitrogen and phosphorous. N concentrations are less than 2.0 mg/l in most waters, organic N was dominant. Median total N concentrations between 1.2 and 2.0 mg/l. 85% of samples, total N exceeded 0.6 mg/l. Median total P concentrations between 0.05 and 0.1 mg/l. Ammonia and nitrate generally are very low emphasizing the rapid uptake by plants and other organisms, abiotic chemical processes. In < 6% of stations sampled, NH4-N > 0.5 mg/l. Phosphorous minerals are a potential source of phosphorous in water in peninsula Florida. Rainfall is a significant source of N and P (due to volume).

Additional Comments
Presentation of rainfall data for Florida with discussion. General overview N, P, TOC, BOD.

Kautz, R. S. 1981. Effects of eutrophication on the fish communities in Florida Lakes. Unpublished report on file in Tallahassee, Florida, USA.

Keenan, L. W., and E. F. Lowe. 2001. Determining ecologically acceptable nutrient loads to natural wetlands for water quality improvement. WetlandWater Science and Technology 44:289-294.
Reference ID: 542
Keywords: General/Wetland/Phosphorus assimilation
Abstract: Natural wetlands often function as nutrient sinks, reducing nutrient inputs into lakes and streams. P loading from anthropogenic sources has significantly affected many natural wetlands. This paper describes a method to determine an acceptable P load to natural wetlands based on ecological principles. This approach can be used to determine how much P can be assimilated without diminishing species diversity and, thereby, sets a limit for cultural eutrophication of natural wetlands. The basis for determining an acceptable load is management of risk to species diversity by determination of the maximum area of a wetland that can be put at risk while preserving biodiversity of the overall wetland system. Two cases are distinguished: 1) simple-stress, where growth of the affected area immediately increases risks for species loss, and 2) subsidy-stress, where growth of the affected area first benefits then diminishes net species diversity.

Ketelle, M. J., and P. D. Uttormark. 1971. Problem Lakes in the United States. University of Wisconsin Water Resources Center, Wisconsin, USA.
Reference ID: 208
Keywords: Problem Lakes/Lakes/Brad Jones/KCOL
Notes: Brent Anderson

Khanal, N. 1974. Water yield to Kissimmee River basin by use of the FCD model. Central and South Florida Flood Control District, West Palm Beach, Florida, USA.
Reference ID: 431
Keywords: Brad Jones/KCOL

Khanal, N., and R. L. Hamrick. 1982. Long term tropical storm incidence: Kissimmee River basin rainfall analysis. Technical Memorandum. South Florida Water Management District, West Palm Beach, Florida, USA.

King, C. H., Jr. Date unknown. The Orlando International Airport: A new concept in surface water management, Project Brief. Greiner Engineering Sciences, Inc., Tampa, Florida, USA.
Reference ID: 209
Keywords: LTMP/Kissimmee Basin/Water quality/Indian Prairie Canal/C-40/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
The purpose of the paper was to inform others of the technique utilized and the objectives set fourth to provide pollution control and environmental enhancement while planning a complex project.

Additional Comments
Description of Boggy Creek drainage. Monitoring stations have been selected.

Kitchens, W. M., Z. C. Welch, A. M. Muench, and J. M. Brush. 2002. Monitoring floral and faunal succession following alternative habitat restoration techniques in a large central Florida lake, 2002 Annual Progress Report. Florida Fish and Wildlife Concervation Commission, Tallahassee, Florida, USA.
Reference ID: 366
Keywords: KCOL/Fish/Lawrence Glenn/Vegetation

Klein, H., J. T. Armbruster, B. F. McPherson, and H. J. Freiberger. 1975. Water and the South Florida Environment. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 210
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Water quality/Fisheating Creek/Taylor Creek/Kissimmee River/Glades County/Highlands County/Okeechobee County/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
Primary objective is to provide information to assist in the formulation of land use policy consistent with the protection of the environment of ENP, adjacent estuaries and public water supplies.

Study Conclusions
South Florida is divided into 9 areas based on land use, 3 of which are in an area of this literature review. Area 1: Taylor Creek, Area 2: Kissimmee River, Area 3: Fisheating Creek. Water quality in Lake Okeechobee sub-area has been extensively degraded due to large scale agricultural activities in Kissimmee River, Taylor Creek basins and the EAA. Agriculture wastes include large amounts of dissolved solids leached from soil exposed by cultivation and nutrients from animal Wastes and fertilizers, washed to canals during heavy runoff. Average dissolved solids content higher in Taylor Creek and EAA than elsewhere in South Florida excluding salt water (=780 mg/l) due mainly to irrigation with highly mineralized water.

Additional Comments
Maps demonstrating regional water quality- no specifics. Data maps include period of record, 1970-71, and dry period vs. wet period.

Knight, R. L., B. Gu, R. A. Clarke, and J. M. Newman. 2003. Long-term phosphorus removal in the Florida aquatic systems dominated by submerged aquatic vegetation. Ecological Engineering 20:45-63.
Reference ID: 628
Keywords: Vegetation/Hydrilla/Coontail/Lakes/Wetlands/Eutrophication/Water quality/Coontail/Certophyllum
Notes: Recorded by Brent Anderson 6/02/2005

Korfmacher, K. S. 1997. Selection of a model for algal blooms on Lake Okeechobee: an application of decision analysis using the analytic hierarchy process (AHP). Lake and Reservoir Management 13:38-43.
Reference ID: 581
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Kratzer, C. R. 1979. Application of input-output models to Florida Lakes. M.S. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 211
Keywords: Input-output model/Model/Lakes/Brad Jones/KCOL
Notes: Brent Anderson

Kratzer, C. R., and P. L. Drezonik. 1981. A Carlson-type trophic state index for nitrogen in Florida lakes. Water Resource Bulletin 17:713-715.
Reference ID: 212
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/East Lake Tohopekaliga/Lake Weohyakapka/Lake Istokpoga/Lake Kissimmee/South Lake/Lake Marion/Crecent Lake/Reedy Lake/Glenada Lake/Lake Tohopekaliga/Hancock Lake/Alligator Lake/Polk County/Orange County/Highlands County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study
A data base consisting of predominantly nitrogen limited Florida lakes from NES was used to develop a trophic state index based on T-N concentrations. This index was compared to Carlson (1977) indices based on secchi, chlorophyll a, to assess the trophic state of 40 NES lakes in Florida.

Study Conclusions

Since this method combines physical, biological and chemical expressions into one indicator, it smoothes out the variability and provides a reasonable composite measure of trophic conditions in a lake. Using this method East Lake Tohopekaliga is mesotrophic, Lake Kissimmee and Lake Tohopekaliga are both eutrophic. Other Florida lakes are included in the study area.

Additional Comments

No raw data reported. Data includes only trophic status for lakes and assessment.

Kreitman, A., R. Walker, and J. Beck. 1974. Water consumption trends within the Central and Southern Florida Control District. Technical Publication No. 74 -3. Central and South Florida Flood Control District, West Palm Beach, Florida, USA.

Kutzman, J. 1974. Shingle Creek/ Lake Tohopekaliga non point vs. point source analysis. Technical memorandum. U.S. Environmental Protection Agency, Atlanta, Georgia, USA.

Lamb, J. M. 2000. Wind induced sediment resuspension in relation to varying submerged macrophyte conerage in two shallow Florida lakes (Lake Istokpoga and Lake Hatchineha). M.S. dissertation. University of Florida, USA, Ganesville, Florida, USA.
Reference ID: 534
Keywords: Lake Hatchineha/Lake Istokpoga/Vegetation

Lamonds, A. G. 1975. Chemical characteristics of the Lower Kissimmee River, Florida, USA- with emphasis on nitrogen and phosphorous. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 214
Keywords: LTMP/Kissimmee Basin/Kissimmee River/Okeechobee County/Glades County/Polk County/Orange County/Highlands County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/22/2005

Brief Description of Study

Purpose was to provide water quality information for water management in the Kissimmee River basin. Specific purposes were (1) determine chemical quality of water in Kissimmee River; (2) Determine loads of plant nutrients, nitrogen and phosphorous carried by the river; (3) determine variations in water quality and nutrient loads along the lower part of the river; (4) relate water quality changes to discharge and seasonal climatic conditions; (5) provide water quality info for water in basin.

Study Conclusions

Concentrations of dissolved solids and phosphorus increase in a downstream direction in the lower Kissimmee River. During study period, average concentrations of P at S65E was 3x's that at S65. The average concentrations of P at S65E was 0.08 mg/l but at 0.25 during low discharge). N concentrations averaged between 1 and 2 mg/l and decreased slightly between S65 and S65E. Dissolved solids concentrations averaged < 160 mg/l. Water moderately hard calcium bicarbonate with downstream increase in dissolved solids due to primarily to increases in the concentrations of CaCO3 and SO4 concentrations. Water in the lower Kissimmee River also contains small amounts of As, several trace metals and two herbicides. No insecticides were detected in water but bottom materials were found to contain low concentrations of several as well as high P concentrations. During summer, lower Kissimmee impoundments often stratified with bottom water lower DO, several degrees cooler, and higher ammonia N and phosphorus than surface waters. When impoundments are stratified, concentrations of NH4-N and P are often higher below the central structure, especially when gate openings are small. The specific conductivity of water in river at S65E during the 70's was twice the average specific conductivity during the 50's. The increase is due to unusually low discharge in recent years, the diversion of Lake Istokpoga drainage and increase in amount of groundwater contribution.

Additional Comments

Raw data and loading data available.

Lichtenberg, J. J., J. W. Eichelberger, and J. B. Longbottom. 1970. Pesticides on surface waters of the United States, a 5 year summary. Pesticides Monitoring Journal 4: 71-87.

Reference ID: 215

Keywords: LTMP/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study

Report summarizes results of 5 annual synoptic surveys (64-68) for chlorinated hydrocarbon pesticides in surface waters of U.S.

Study Conclusions

Results showed widespread occurrence of these compounds. Number of occurrences peaked in 66 then declines sharply in 67 and 68. DDT and its congeners DDE and DDD were compounds most frequently detected. Maximum concentrations found have not exceeded permissible limits as they relate to human consumption from domestic water supplies. However, often exceed environmental limit of 0.05 mg/l recommended by the Federal Committee on water quality.

Additional Comments

5 stations in Florida- Closest to study area is Lake Apopka and Oklawako River in Orlando

Lichtler, W. F. 1972. Appraisal of water resources in the east central Florida region. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 216

Keywords: LTMP/Kissimmee Basin/Shingle Creek/Reedy Creek/Boggy Creek/Bonnet Creek/Orange County/Osceola County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study

Purpose is to summarize recently available information concerning the water resources of the region and to begin and to appraise the water situation in the light of additional information. The report points out the need for sound management of the water resources of the region as a whole and discusses various practices and techniques that can preserve and enhance its water resources.

Study Conclusions

Water in streams is usually higher in mineral content during periods of low flow and higher in color during periods early into high flow. pH changes seasonally. Concentrations of pollution in streams will vary with volume of flow and composition can also vary.

Additional Comments

No raw data or conclusions other than above.

Lichtler, W. F., W. Anderson, and B. F. Joyner. 1964. Interim report on the water resources of Orange County, Florida, USA. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.

Reference ID: 217

Keywords: LTMP/Kissimmee Basin/Reedy Creek/Boggy Branch/Jim Branch/Bonnet Creek/Orange County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study

The purpose of this investigation is to furnish data that will be useful in the conservation, development and management of Orange County water resources.

Study Conclusions

Bonnet Creek slightly higher mineral content and less color than the water in most streams in the county. Mineral 107ppm, hardness 66ppm, color 10 units on November 1959. Higher mineral content, low color probably due to groundwater. June, 1960 May 1961 Ready Creek to be very soft and low in mineral

content at low flow, hard (11ppm) and mineral conductivity was 24ppm. Shingle Creek waters demonstrate low mineral and soft. Dissolved organics represent 50 % of dissolved solids, high color, especially during high flow. Dissolved solids are less than 165ppm with hardness < 30ppm. Usually color ranges from 55-200 units. Boggy Creek water is usually soft low mineral and high color. Total TDS range 59-115ppm, dissolved mineral 29-62ppm, 50% of total dissolved material is organic. Color (45-140 units) usually high during early part of flood periods. Hardness < 20ppm. Jim Branch- Low flow 1961 water very soft (9ppm) and low mineral (30ppm estimated in conductivity).

Additional Comments
Report includes description of study area and station locations. Surface water data has been collected from 62 sites in the county. Stream discharge (Cypress Creek) data is available. Groundwater records including quality (NO3, SO4, color)

____. 1968. Water resources of Orange County, Florida, USA. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 218
Keywords: LTMP/Kissimmee Basin/Bonnet Creek/Jim Branch/Reedy Creek/Lake Hart/Lake Conway/Lake Francis/Spring Lake/Orange County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
The purpose of this investigation is to data that will be useful in the conservation, development, and management of the water resources of Orange County. Knowledge of all factors affecting the water resources of an area is necessary for the protection, efficient development and management of water supplies. Report includes determinations of variation in lake levels, stream flow, chemical quality of surface and groundwater and groundwater levels, elevation of stream-basin characteristics, delineation of recharge and discharge areas, investigation of characteristics of the water bearing formations, assembly of water-use and interpolations of water data.

Study Conclusions
Water in lakes and streams of Orange County generally are soft, low in mineral content and high in color. Quality of water in most lakes remains fairly consistent except where pollution enters lakes. Reedy Creek's water is very soft with low mineral content. Bonnet Creek- slightly higher mineral content, less color during low flow than water in most county streams. November 1959 mineral content of 107ppm, hardness 66ppm, color 10 units. During high flow, low mineral (35ppm), soft (17ppm hardness), high color (400 units) and low ph (4.5). Water runoff swamplands. Cypress Creek quality similar to Bonnet Creek during high flow (32ppm), mineral (18ppm), hardness (450), color (4.4), pH no data available during low flow. Shingle Creek generally low mineral and soft. Low flow however, mineral content is as high as 150ppmand water moderately hard (66ppm) indicating groundwater inflows to stream. High flow pH = 5.7 with high color. High Fe (0.73ppm). Relatively high Na, Cl (35 and 37 respectively) indicated pollution as the groundwater in area is generally < 10ppm Cl and low Na. Boggy Creek water is soft, low in mineral content and high in color. Lake Francis lowest mineral content, Spring Lake has the highest.

Additional Comments
Gives range of chemical quality of select parameters (physical, nutrients, conservations)

Loehr, R. C. 1974. Characteristics and comparative magnitude of non-point sources. Journal of the Water Pollution Control Federation 46:1849-1872.
Reference ID: 219
Keywords: Pollution/Runoff/Non-point source pollution/Non-point/Brad Jones/KCOL
Notes: Brent Anderson

Loftin, M. K. 1990. The Kissimmee River yesterday and today. Pages 5-8 in M. K. Loftin, L. A. Toth, and J. T. B. Obeysekera, editors. Proceedings of the Kissimmee River restoration symposium. South Florida Water Management District, West Palm Beach Florida, USA.
Reference ID: 435

Keywords: Brad Jones/KCOL

Lowe, E. F. 1986. Relationship between hydrology and vegetational pattern within the floodplain marsh of a subtropical, Florida Lake. Florida Scientist 49:213-233.

Reference ID: 544

Keywords: Blue Cypress Lake/Vegetation

Abstract: The floodplain marsh of ***Blue Cypress Lake***, in east-central Florida, was examined to determine the spatial pattern of the vegetation and its relationship to hydrologic conditions. Visual observation and direct gradient analysis of shoreline vegetation indicated six floristic zones. The sequences of biomass maxima of common species and their distributional limits with respect to elevations suggested that this zonation was a result of a complex-gradient in long-term hydrologic factors caused by topographic relief. Beyond the ***lake*** shore, on the marsh flat, the zoned pattern was replaced by a mosaicof communities similar to those of large areas of the Everglades. That portion of the mosaic accounted for by communities dominated by Cladium jamaicense (sawgrass) and Panicum hemitomon (maidencane) apparently did not result from hydrologic factors. This was suggested by the sharp borders typically found between these two communities and by the low topographic relief, and consequent uniformity of hydrologic conditions of the marsh flat. Fire may be the major effector of pattern for these communities by the following mechanism. Maidencane, and its associated species, rapidly colonize areas where dense stands of sawgrass were destroyed by intense fire and then inhibit establishment of sawgrass seedlings. Sawgrass reclaims these areas, through vegetative reproduction, as a slowly moving front which monopolizes space and light. (Author 's abstract)

Lowe, E. F., L. E. Battoe, M. Coveney, and D. Stites. 1999. Setting water quality goals for restoration of Lake Apopka: Inferring past conditions. Lake and Reservoir Management 15:103-120.

Reference ID: 626

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 6/02/2005

Lowe, E. F., L. E. Battoe, D. L. Stites, and M. F. Coveney. 1992. Particulate phosphorus removal via wetland filtration - an examination of potential for hypereutrophic lake restoration. Environmental Management 16:67-74.

Reference ID: 522

Keywords: Lake Apopka/Phosphorus assimilation/Wetland

Abstract: Lake Apopka in Florida, USA, is a large (area = 124 km2), hypertrophic (mean total phosphorus = 0.220 g/m3; mean chlorophyll a = 60 mg/m3) lake, with a large sedimentary store of available P (1635 x 10(6) g P). Phosphorus loading from floodplain farms (132 x 10(6) g P/yr) has been the primary cause of eutrophication, Assuming elimination of farm P loading, the Vollenweider model predicts a decline in equilibrium P concentration from 0.270 to 0.024 g/m3, if the P sedimentation coefficient (sigma) remains constant. It is likely, however, that the value for sigma will fall with the elimination of farm loading due to unabated internal P loading from the sediments. Under a worst-case scenario (sigma = 0), the model predicts that exportation of P from the lake via wetland filtration will greatly accelerate the lake's recovery. Recirculation of lake water through a 21-km2, created wetland and elimination of farm P loading is projected

to result in a negative P balance for the lake (-23 x 10(6) g P/yr) leading to depletion of P stores in the lake in about 60 yr. The estimated cost of the project, $20 million, is less than 3% of the estimated cost of dredging. A 3.65-km2 demonstration project is underway to test and refine the wetland filtration technique. We believe the technique could be cost-effective for other hypertrophic lakes.

Maceina, M. J. 1993. Summer fluctuations in planktonic chlorophyll a concentrations in Lake Okeechobee, Florida: The influence of lake levels. Lake and Reservoir Management 8:1-11.
Reference ID: 593
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Maceina, M. J., and D. M. Soballe. 1990. Wind-related limnological variation in Lake Okeechobee, Florida. Lake and Reservoir Management 6:93-100.
Reference ID: 598
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

MacGill, R. A., S. E. Gatewood, C. Hutchinson, and D. D. Watlker. 1976 . Final report of the Special Project to Prevent Eutrophication of Lake Okeechobee. Florida Department of State Planning, Tallahassee, Florida, USA.
Reference ID: 512
Keywords: KCOL/Robert Pace/Lake Okeechobee/Eutrophication/Nutrients/Water Quality/Brad Jones
Notes: Recorded by Brent Anderson 5/24/2005

Mack, B. W., J. G. Jordan, C. E. Cook, T. Heiker, and M. Flomerfelt. 1998. Stormwater master planning case studies in Florida. Florida Water Resources Journal. September:29-32.
Reference ID: 498
Keywords: Chris Carlson/Brad Jones/KCOL/Nutrients
Notes: Recorded by Brent Anderson 5/4/2005
Chris Carlson personal copy

Abstract: Successful stormwater master planning efforts have several key elements including goal setting, problem identification and assessment (flooding, water quality, and ecological considerations), development of prioritized solutions, and public involvement. This article presents two case studies that include these key elements. For brevity, select details of these general elements have been highlighted. These details include goal setting, stormwater modeling efforts (highlighting the importance of model calibration) for planning and design, and improved operation and maintenance.

Marshall, A. R., J. H. Hartwell, D. S. Anthony, J. V. Betz, A. E. Lugo, A. R. Veri, and S. U. Wilson. 1972. The Kissimmee-Okeechobee Basin- A report to the Florida Cabinet, Tallahassee, Florida. Center for Urban regional Studies, Division of Applied Ecology, Miami, Florida, USA.
Reference ID: 222
Keywords: LTMP/Kissimmee Basin/Kissimmee River/Okeechobee County/Glades County/Osceola County/Highlands County/Water quality/Nutrients/KCOL/ Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
Public service document to bring to the attention of the Florida Cabinet the problems associated with the Kissimmee-Okeechobee basins as they relate to water quality.

Study Conclusions

Waters in the Kissimmee-Okeechobee system are receiving an overdose of nutrients (N and P). The major input of nutrients to Lake Okeechobee in 1969-1970 was via the Kissimmee River, with substantial input from rainfall, and other tributaries (based upon N from USGS report-Joyner)

(Section- Optimizing the management of the Kissimmee River Basin Marshes for maximum value to man): Water quality deteriorates as one moves downstream, causing alterations to the ecology of Lake Okeechobee and water releases now show sharp peaks during the rainy period followed by very low during the dry period. Fig 11 shows the determination of water quality moving from Lake Tohopekaliga south to Lake Okeechobee. The rapid flow of nutrient laden water is one of the main factors accounting for the deterioration of these waters.

Mattraw, H. C., Jr. 1975 . Occurence of chlorinated hydrocarbon insecticides, Southern Florida, USA, 1968-1972. Pesticides Monitoring Journal 9:106-114.

Reference ID: 223

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Kissimmee River/Okeechobee County/Glades County/Highlands County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Reocrded by Brent Anderson 4/26/2005

Brief Description of Study

The persistence of several of the restricted insecticides and the potential of the hydrologic system to disperse them throughout the area have resulted in the initiation of several programs by the Geological Survey, U.S. Department of the Interior, to analyze water and sediment from much of South Florida.

Study Conclusions

The frequency with which chlorinated hydrocarbons insecticides appear in samples in South Florida surface waters decreased sharply between 1968 and 1972. The decrease in frequency of detectable insecticide residues in South Florida probably reflects restrictions on agricultural applications.

Additional Comments

No specific resources were studied other than “surface water sediments

May, B. E. 1972. Evaluation of large scale release programs with special reference to bass fishing tournaments. Pages 325-334 in Proceedings of the 26th Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners,

Reference ID: 560

Abstract: A study was conducted to assess the effectiveness of an extensive release program conducted in conjunction with the B.A.S.S. (Bass Anglers Sportsman Soc.) Tournament held on Lake Kissimmee and adjoining lakes, Osceola Co., FL. Largemouth bass (Micropterus salmoides) caught by tournment participants were to be released into Lake Kissimmee following weighing and counting by tournament officials. Fish in poor condition and mortalities incurred prior to release were included into an initial mortality estimate of 15.6 per cent by number and 13.7 per cent by wt. A sample of fish to be released was taken and held for observation in anchored cages for 14 days to estimate delayed mortality resulting from hooking, handling, and related stresses. Control fish captured by non-angling methods were held simultaneously. Mortality incurred subsequent to release (delayed mortality) was estimated at 15.0 per cent by number for a 6-day period. A total mortality estimate of 30 per cent was projected to this particular tournament. A 2nd study was initiated, under more controlled conditions, to evaluate bass survival over extended periods of time. Recommendations based on tournament observations and study findings were formalized to aid in future large scale release programs.

McCaffrey, P. M., W. W. Hinkley, R. MacGill, and G. D. Cherr. 1975. Report of investigations in the Kissimmee River-Lake Okeechobee watershed. Technical Series 2(2). Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

McCaffrey, P. M., W. W. Hinkley, J. M. Ruddell, and S. E. Gatewood. 1977. First annual report to the Florida legislature. Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubin Slough Basin, Tallahassee, Florida, USA.
Reference ID: 224
Keywords: Kissimmee River/Taylor Creek/Nubin Slough/Brad Jones/KCOL
Notes: Brent Anderson

McCormick, P. V., M. B. O'Dell, R. B. E. Shuford , J. G. Backus, and W. C. Kennedy. 2001. Periphyton responses to experimental phosphorus enrichment in a subtropical wetland. Aquatic Botany 71:119-139.
Reference ID: 524
Keywords: General/Periphyton/Wetland
Abstract: A field experiment was conducted to determine the effects of increased phosphorus (P) loading on periphyton abundance, productivity, and taxonomic composition in an oligotrophic Everglades slough characterized by abundant metaphyton and epiphyton. Mesocosm enclosures were dosed weekly with different orthophosphate loads (0-12.8 g P m(-2) per year) for 5 months during the summer wet season (late June-November 1995). Added P was accumulated rapidly by the periphyton at a rate proportional to the load. Phosphorus accumulation caused the loss of the extensive mats of cyanobacteria and diatoms that were abundant in the surrounding slough. This oligotrophic assemblage was replaced by floating mats of eutrophic cyanobacteria and diatoms at the highest loading rates (6.4-12.8 g P m(-2) per year), and by diffuse masses of filamentous chlorophytes at intermediate loads (1.6-3.2 g P m(-2) per year). Metaphyton and epiphyton biomass-specific productivity increased in proportion to the loading rate and remained elevated at higher loads until the end of the wet season. Respiration rates also tended to increase with P load but were never significantly higher than in unenriched mesocosms. Despite higher productivity rates, both epiphyton biomass and floating mat coverage declined at higher loads compared to controls. Periphyton changes induced by P enrichment may affect wetland function by reducing (1) periphyton dominance, (2) the food quality of the periphyton for herbivores, and (3) the nutrient storage capacity of the wetland. Many of these changes also have been documented in other wetlands, thereby implicating P as a principal factor affecting wetland periphyton structure and function. (C) 2001 Elsevier Science B.V. All rights reserved.

McDiffet, W. F. 1980. Limnological characteristics of several lakes on the Lake Wales Ridge, South Central Florida, USA. Hydrobiologia 71:137-145.
Reference ID: 226
Keywords: Limnology/Limnological characteristics/Lake/Lakes/Lake Wales Ridge/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

____. 1981. Limnological charateristics of Eutrophic Lake Istokpoga, Florida, USA. Florida Scientist 44:172-181.
Reference ID: 227
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Lake Istokpoga /Josephine Creek/Arbuckle Creek/Highlands County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
Investigation of Lake and Tributaries conducted between October, 1976 and June, 1977.

Study Conclusions
Significant N and P loading of lake by influent streams. High productivity with average carbon fixation rate of 0.8gm/m3/day. Seasonably variable nutrient enrichment bioassays. Lake appears P limited and eutrophic. 2 major influents noted, Josephine Creek and Arbuckle Creek. Primary land use is agriculture, about 50% of TDP in streams was Ortho P while only trace amounts in lake were detected. Water well mixed.

Additional Comments
Dry season study only. Report suggests performing enrichment bioassays in a seasonal basis. Report contains physiochemical constituents, productivity, chlorophyll a, bioassays.

Messer, J. J., P. L. Brezonik, and B. R. Snyder. 1979. Denitrification in Lake Okeechobee, Florida, USA. University of Florida, Department of Environmental Engineering Sciences, Gainesville, Florida, USA.
Reference ID: 228
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Lake Okeechobee/Water quality/Nutrients/KCOL/ Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
Report summarizes investigations of the importance of denitrification in Lake Okeechobee.

Study Conclusions
Based on other reports, Kissimmee was most important source of N and water for these budgets, and backpumped agriculture waters from EAA and rainfall were also important. P load dominated by Taylor Creek with Kissimmee being significant. N fixation brought about by C:N ratios organic matter entering lake from EAA and Fisheating Creek watersheds leads to increasing loads of N and thus increasing denitrification rates.

Additional Comments
Report summarizes historical N and P loads to Lkae (psi). This report is on Lake Okeechobee, however, summary tables of inflow loads are presented in chapter 1.3

Miles, C. J., and P. L. Brezonik. 1981. Oxygen consumption in Humic-colored waters by a photochemical ferrous-ferric catalytic cycle. Environmental Science Technology 15:1089-1095.
Reference ID: 229
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Lake Okeechobee/Glades County/Highlands County/Okeechobee County/Fisheating Creek/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
The observation that humic-colored surface waters frequently are under-saturated with O2 has led investigations to suggest that a photochemical oxidation mechanism may be responsible for the observed O2 deficiency- hence this study's objective. Since iron is usually associated with humic materials, it also has been suggested as a catalyst in the reaction.

Study Conclusions
Lab results indicate O2 consumption indicate O2 consumption increased linearly with increasing amounts of added Fe III in both light and dark extrapolated to zero iron concentration indicated negative O2 consumption in absence of iron. O2 consumption increased nonlinearly with increasing light energy and linearly with increasing humic matter concentrations. Rate of Fe II oxidation is 1ş with respect to O2 and 2ş with respect to OH-. Although the O2 consumption reaction was 1ş with respect to O2, the rate was only fractional order (~0.2) with respect to (OH-), indicates that O2 consumption in humic colored water involves a mechanism different from simple O2 of free Fe (II) in presence of humic acid was also fractional (~0.36) with respect to (OH-), thus supporting the hypothesis that O2 consumption by Fe and humic rich

systems is caused by the Fe (II) cycle. Based on insitu experiments, if photosynthetic activity is low, the catalytic mechanism can be a significant factor in depleting O2 in the photic zones of humic colored lakes. Some organics have been able to retard O2 of Fe (II) while others accelerate it. Humic acids retard Fe II) oxidized to a higher degree at higher concentrations and lower pH values. Retardation of Fe (II) oxidation in organic solutions could be the result of simultaneous Fe (III) reduction by organics. Example citric and humic acids reduce Fe (II) in light while net Fe (II) oxidation occurred in the dark.
See report for more detail.

Additional Comments
Theoretical equation for iron, organic material and O2 inter-reaction is described. Other Florida Lakes were studied with some data (dissolved O2, pH, Total Fe, DOC, color, O2 consumption.

Miller, D. H., and J. Boyd. 1983. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Report 4, Third year poststocking results. Miller & Miller, Inc., Orlando, Florida, USA.

Miller, D. H., and R. Potts. 1982. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Report 3, Second year poststocking results. Canin/Miller Associates, Orlando, Florida, USA.

Miller, W. L. 1975. Nutrient concentrations of surface waters in Southern Florida, USA, September 1970 - April 1975. U.S. Department of the Interior, Geological Survey, Tallahassee, Florida, USA.
Reference ID: 230
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Kissimmee River/Harney Pond/C-41/Indian Prairie Canal/C-40/Fisheating Creek/Taylor Creek/Nubbins Slough/Glades County/Okeechobee County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/26/2005

Brief Description of Study
The purpose is to present all data obtained during the 9 sampling runs under one cover. Compare data for all periods through plots. No discussion of concentration variations is presented.

Study Conclusions
None

Additional Comments
No discussion of the results. Data maps only

Milleson, J. F. 1978. Limnological investigations of seven lakes in the Lake Istokpoga drainage basin. Technical Publication No. 78-1. Resource Planning Deptarment, South Florida Water Management District, West Palm Beach, Florida, USA.

____. 1975. Progress report: Upper Kissimmee Chain of Lakes water quality and benthic invertebrate sampling. Technical Publication 75-2. Central and Southern Florida Flood Control District, West Palm Beach, Florida, USA.

Mock, Roos & Associates, Inc. 2003. Lake Istokpoga/Upper Chain of Lakes Basin phosphorus control report. Report submitted to the South Florida Water Management District. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 440
Keywords: LTMP/Lake Istokpoga/Reedy Creek/Shingle Creek/Boggy Creek/Lake Hart/Lake Tohopekaliga/East Lake Tohopekaliga/Lake Hatchineha/Lake Cypress/Lake Arbuckle/Arbuckle Creek/Josephine Creek/Lake Istokpoga/Lake Marian/Lake Marion/Lake Weohyakapka/Orange County/Okeechobee County/Polk County/Highlands County/Glades County/Lake Kissimmee/Osceola County/Water quality/Nutrients/KCOL/Brad Jones/Chris Carlson
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

The contributions of P load to Lake Okeechobee from Lake Istokpoga (S68) and Upper Chain of Lakes (S65) Watersheds have increased 2.5 and 3.6 times, respectively, in the last five years. SFWMD has identified P as the primary cause of eutrophication of Lake Okeechobee. The Lake Okeechobee Protection Act of 2000 sought to have the P load increases scrutinized by requiring the SFWMD to conduct an assessment of the sources of P from the Upper Kissimmee Chain of Lakes and Lake Istokpoga and their relative contribution to the water quality of Lake Okeechobee. These four reports summarize the conclusions that were made from a detailed land use survey and P assessment (mass-balance budget analysis) to determine the sources of P import and export in these watersheds. The following tasked were performed and are discussed in the report; (1) data acquisition and assessment (2) phosphorus budget and loading analysis (3) Establish relationships between Basin characteristics and net P imports.

Mooij, W. M., R. E. Bennetts, W. M. Kitchens, and D. L. DeAngelis. 2002. Exploring the effect of drought extent and interval on the Florida snial kite: interplay between spatial and temporal scales. Ecological Modeling 149:25-39.

Reference ID: 504

Keywords: KCOL/Snail Kite/Drought/Agustin Valido

Notes: Recorded by Brent Anderson 5/23/2005

Morales, N. E. 2002. Long-term spatial and temporal trends in total phosphorus concentration in the Kissimmee River Upper Basin: Implications to Lake Okeechobee water quality. Unpublished report on file in West Palm Beach, Florida, USA.

Moyer, E. J. 1988. Lake Tohopekaliga muck removal project. Page 41 in Proceedings of the 8th international Symposium on Lake and Watershed Management.

Reference ID: 552

Keywords: Lake Tohopekaliga/Muck/Vegetation

Abstract: Excessive fertility, growth of bands of water hyacinth (Eichhornia crassipes), and regulated water levels during a 25-year period (1963 to 1987) contributed to a gradual build-up of detritus intermixed with live plants and flocculent organic sediments at Lake Tohopekaliga. This material formed a low-water berm around much of the lake's perimeter, causing a decrease in productivity of both aquatic invertebrates and forage fish, and providing a viable substrate for germination of undesirable aquatic plants. When annual water levels dropped below the average regulated stage (elevation 53.5 MSL) the berm became a physical barrier, limiting the natural lakeward movement of shallow water fish populations and migration of sport fish into productive shallow water spawning areas. Florida Game and Fresh Water Fish Commission biologists implemented a project that restored 87-ha of lake bottom habitat by scraping and removing 87,835 m super(3) of muck. This lake restoration technique removed 3,436 kg of P and 72,162 kg of N from the lake.

Moyer, E. J., M. W. Hulon, R. S. Butler, R. W. Hujik, J. Buntz, D. C. Arwood, C. S. Michael, and A. C. Jasent. 1991. Kissimmee Chain of Lakes studies. Completion report for study III: Boggy Creek/East Lake Tohopekaliga investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 627

Keywords: Drawdown/East Lake Tohopekaliga/Boggy Creek/Electrofishing /Water quality/Laura Carnal/KCOL/SB/Burn/burning/fire/vegetation/littoral

Notes: Burn and disking treatments p 21; plant biomass/presence before-after treatments p 69-72

Moyer, E. J., M. W. Hulon, G. L. Zuhl, D. C. Arwood, W. H. Kurtz, and C. A. Harris. 1985. Kissimmee Chain of

Lakes Studies. Completion report for study V: Lake center fish population investigations. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 352
Keywords: LTMP/Fish/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document provides baseline data on relative abundance, species richness, diversity, and biomass of Sportfish and forage fish in Lake Center between 1983 and 1985.
Size distribution of sportfish also are reported.
Creel data also was collected for the same period of time.

What parameters were monitored?
Relative abundance, species richness, diversity, and biomass of sportfish and forage fish.
Size distribution of sportfish.
Angler effort.

What was the geographic extent of monitoring?
Lake Center

How many samples or sample locations were monitored?
Three 15 minute electrofishing samples (5 mins shallow, intermediate, and deep water in littoral zone).
12 Wegener ring samples

What was the sampling frequency and duration (period of record)?
Annual electrofishing during spring in 1984 and 1985.
Annual Wegener ring sampling conducted in water ranging in depth from 0-18 inches.

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Unsure if raw data are maintained in FGFWFC database

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data quality is good

Are raw data and/or summarized data presented in the document?
Data provided in this document are summarized.

Is a summary of findings presented in the document?
Yes

Moyer, E. T., and V. P. Williams. 1982. Effects of lake bottom channelization on invertebrate fish food organisms on Lake Tohopekaliga, Florida. Pages 294-304 in J. R. Sweeney, J. M. Sweenwy, P. Doerr, and L. Nielsen, editors. Proceedings of the Thirty-sixth Annual Conference, Southeast Association of Fish and Wildlife Agencies. Southeast Association of Fish and Wildlife Agencies, Charleston, South Carolina, USA.
Reference ID: 341
Keywords: Macroinvertebrates/Baseline/Joe Koebel/KCOL
Notes: Recorded by Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?

Data primarily deal with relative abundance of macroinvertebrate groups in benthic and littoral vegetation habitats.

What parameters were monitored?

Benthic invertebrates and invertebrates associated with littoral vegetation.

What was the geographic extent of monitoring?

Lake Tohopekaliga, Florida

How many samples or sample locations were monitored?

A total of 6 transect were sampled at 0.3 m intervals. Total length of transect is unknown.

What was the sampling frequency and duration (period of record)?

July 1979, 1980, 1981
December 1979, 1980

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

FGFWFC (FFWCC)

Where are the data located? (agency or organization maintaining database)

FFWCC, Kissimmee, Florida

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Unknown

Are raw data and/or summarized data presented in the document?

Summarized data presented in table format in text of document.

Is a summary of findings presented in the document?

Yes

Comments: This study documents the relationship between the decline of macroinvertebrate standing crop (No/m^2) and loss of aquatic habitat in Lake Tohopekaliga, Florida. Channelization and macrophyte removal reduced or eliminated macroinvertebrates associated with channel benthic and littoral vegetation habitats. Loss of fish food macroinvertebrates may result in loss of productivity in sport fish populations.

Some interesting data on macroinvertebrate community composition of littoral vegetation and channel benthic habitats are presented. Family-level taxonomy limits analyses to total number of organisms and "family" richness (compared to species richness). Data are probably of little value in developing a performance measure for species richness and diversity of benthic invertebrates. Data may be useful in determining relative abundance of macroinvertebrate indicator groups.

J.W. Koebel Jr. 2/14/2005

Moyer, E. J. 1991. Lake Tohopekaliga muck removal project, A turning point. Newsletter of the Florida Management Society 4:1-5.

Reference ID: 386

Keywords: KCOL/Lawrence Glenn/Fish/Lake Tohopekaliga/Muck

Notes: Recorded by Brent Anderson 4/4/2005

Moyer, E. J., M. W. Hulon, R. S. Butler, and V. P. Williams. 1992. Lake Tohopekaliga muck removal project. Pages 18-25 in C. E. Watkins, H. McGinnis, and K. J. Hatcher, editors. Proceedings of the First Annual Southeastern Lake Management Conference. North American Lake Management Society, Alachua, Florida, USA.

Reference ID: 491

Keywords: Chris Carlson/Lawrence Glenn/Fish/Brad Jones/Nutrients/KCOL/Muck/ Lake Tohopekaliga

Notes: Recorded by Brent Anderson 5/4/2005

Abstract: During a 24-year period from 1963 to 1987, excessive fertility, growth of water hyacinth (Eichhorinia crassipes) mats and regulated water levels in Lake Tohopekaliga contributed to gradual build-up of organic muck, a substrate comprised of detritus mixed with live plants and flocculent sediments. This material formed a berm along the lake's low-water shoreline which destroyed valuable littoral habitat around much of the perimeter of Lake Tohopekaliga. This berm became a physical became a physical barrier limiting the natural movement of shallow water fish population and the migration of sport fish, such as largemouth bass, into historically productive shallow water spawning habitat. Florida Game and Fresh Water Fish Commission biologists implemented a project in 1987 which restored 136 ha of lake-bottom habitat by scraping and removing 164,839 m^3 of muck. This material was transported to upland areas adjacent to seven work sites which stretched along 19 km of shoreline. The mean width of the organic band was 78 m, with individual areas ranging from 11 to 161 m. Organic sediments varied between 10 and 58 cm indepth. This lake restoration technique was estimated to have removed approximatelt 6,460 kg of elemental phosphorus and 135,950 kg of elemental nitrogen from the lake. The project was completed in conjunction with the 1987 extreme drawdown of Lake Tohopekaliga. Total labor and equipment costs for the program were $446,705.

Moyer, E. J., M. W. Hulon, J. J. Sweatman, R. S. Butler, and V. P. Williams. 1995. Fishery response to habitat restoration in Lake Tohopekaliga, Florida. North American Journal of Fisheries Management 15:591-595.

Reference ID: 493

Keywords: Lawrence Glenn/Fish/Chris Carlson/KCOL/Muck

Notes: Recorded by Brent Anderson 5/4/2005

Abstract: During the 1987 drawdown of Lake Tohopekaliga, 19 km of degraded littoral zone were restored when approximately 165,000 m^3 of sediments were removed. Electrofishing data from 1988 and 1989 indicated median catch per effort for largemouth bass *Micropterus salmoides*, redear sunfish *Lepomis microphus*, and forage fish was significantly greater in restored sites than in nonrestored sites. Median catch per effort values in restored sites also were higher for bluegill *Lepomis macrochirus*, but the differences were statistically significant only in 1988. sampling in shallow water with Wegener rings in 1988 indicated that age-0 largemouth bass and other sport fish were more abundant in restored sites than control sites. Sport fish reproduction was reduced in restored sites during 1989 and could not be detected in control sites. We conclude that in Lake Tohopekaliga an extreme drawdown coupled with mechanical removal of organic sediments from the littoral zone provided an immediate positive fisheries response.

Moyer, E. J., M. W. Hulon, and G. L. Zuhl. 1982. Water level manipulation project. Completion report for Study V: Lake Kissimmee monitoring. State of Florida Game and Fresh Water Fish Commission, Talahassee, Florida, USA.

Reference ID: 388

Keywords: KCOL/Fish/Lawrence Glenn/Lake Kissimmee

Notes: Recorded by Brent Anderson 4/4/2005

Moyer, E. J., M. W. Hulon, G. L. Zuhl, D. C. Arwood, W. H. Kurtz, and C. A. Harris. 1985. Kissimmee Chain of Lakes studies. Completion report for study IV: Brick Lake fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 376

Keywords: KCOL/Lawrence Glenn/Fish/Brick Lake

Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study VI: Coon Lake fish population

investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 377
Keywords: KCOL/Lawrence Glenn/Fish/Coon Lake
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study VII: Lake Lizzie fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 378
Keywords: KCOL/Lawrence Glenn/Fish/Lake Lizzie
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study VIII: Trout Lake fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 379
Keywords: KCOL/Lawrence Glenn/Fish/Trout Lake
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study IX: Lake Hart fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 380
Keywords: KCOL/Lawrence Glenn/Fish/Lake Hart
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study X: Lake Mary Jane fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 381
Keywords: KCOL/Lawrence Glenn/Fish/Lake Mary Jane
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study I: East Lake Tohopekaliga fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 382
Keywords: KCOL/Lawrence Glenn/Fish/East Lake Tohopekaliga
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study II: Alligator Lake fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 383
Keywords: KCOL/Lawrence Glenn/Fish/Alligator Lake
Notes: Recorded by Brent Anderson 4/4/2005

____. 1985. Kissimmee Chain of Lakes studies. Completion report for study III: Lake Gentry fish population investigations. State of Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 384
Keywords: KCOL/Lawrence Glenn/Fish/Lake Gentry
Notes: Recorded by Brent Anderson 4/4/2005

Myers, R. L., and J. J. Ewel. 1990. Ecosystems of Florida. University of Central Florida Press, Orlando, Florida, USA.

Reference ID: 488
Keywords: Brad Jones/Chris Carlson/Water quality/Nutrients/KCOL
Notes: Recorded by Brent Anderson 5/4/2005

Nesbitt, S. A., J. C. Ogden, H. W. Kale II, B. W. Patty, and L. A. Rowse. 1982. Florida atlas of breeding sites for herons and their allies, 1976-1978. U.S. Fish and Wildlife Service, Office of Biological Services, Place of publication unknown.

Reference ID: 349
Keywords: Birds/Wading Birds/Stork/Colonies/Baseline/Gary Williams/KCOL
Notes: Recorded by Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?
Species richness, diversity, and relative abundance of rookeries

What parameters were monitored?
Wading bird nesting colony location, species composition, years of activity

What was the geographic extent of monitoring?
Upper Basin

How many samples or sample locations were monitored?
All colonies in the Upper Basin

What was the sampling frequency and duration (period of record)?
Twice per year during 1976 1978.

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
FWC

Where are the data located? (agency or organization maintaining database)
FWC

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Summaries of data are available for each colony.

Is a summary of findings presented in the document?
No. The document reports wading bird breeding colonies by county. At the beginning of each section, a county map shows the locations of all colonies that were found during surveys (mostly aerial, some ground) conducted twice a year (early, late breeding season) during 1976 1978. Within each section, information is presented for each colony, including coordinates, description of colony site and habitat surrounding the colony, and approximate number of pairs and species composition of the colony.

Nesbitt, S. A., R. R. Roth, and W. B. Robertson, Jr. 1976. The status of the bald eagle in Forida, 1972-1975. Pages 424-428 in W. A. Rogers, editor. Proceedings of the Twenty-ninth Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners, Columbia, South Carolina, USA.

Reference ID: 327
Keywords: Eagle/Baseline/Birds/Gary Williams/KCOL
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?
Number of eagle nests

What parameters were monitored?
Number of nests, nesting tree characteristics

What was the geographic extent of monitoring?
Most of Florida, all of Upper Basin

How many samples or sample locations were monitored?
All territories within the Upper Basin

What was the sampling frequency and duration (period of record)?
Annual, 1972 1975.

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
FWC

Where are the data located? (agency or organization maintaining database)
Not applicable

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Summarized

Is a summary of findings presented in the document?
Yes. The report summarizes the number of bald eagle territories and nesting habitat for territories monitored. Summary is available for region and statewide. The Upper Basin was included in the Central Florida region. The Central Florida region contained approximately 56 % (n = 159) of the state's nests during 1972 1975. In the Central Florida region, nearly all nests were built in either pine (80%) or cypress (17%). Approximately 60 % of nest trees were surrounded by cover that was described as open, while 33 % were in dense cover; cover was not specified for 7 % of nests. The authors noted that eagles tended to choose somewhat open sites in pastures or near water edges or else large supercanopy trees that were taller than surrounding vegetation.

Nichols, J. C., W. G. Thiess, P. B. Joshi, and T. J. Turco. 1982. Recommended water quality impact analysis for the Kissimmee River study. Pages 33-42 in P. M. McCaffrey, T. Beemer, and S. E. Gatewood, editors. Proceedings of the progress in wetlands utilization and management symposium. Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins, Tallahassee, Florida, USA.
Reference ID: 233
Keywords: LTMP/Kissimmee Basin/Kissimmee River/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Study was undertaken to formulate an assessment methodology for evaluating water quality impacts of various restoration alternatives for the Kissimmee River. A brief inventory and discussion of available water quality management models is presented.

Study Conclusions
P levels in C-38 between s-65 and S65E were found to increase in a downstream direction first by the USGS in 1972 1973. Loading calculations included that the drainage basin below Lake Kissimmee

contributed 86% of the Total P load reaching S65E. It was also estimated that 37% of the original load originated between S65D and E and 65% between S65C and E. Primary sources of P loading to Kissimmee River appear to be diffuse and related to land use. P levels are not uniform throughout the lower basin, but are concentrated in lower half. Significant sources and factors affecting P loads are (1) fertilizer application, (2) animal unit density/capacity ratios, grazing pasture, supplemental feed requirements, water course accessibility, export rates and utilization periods as they relate to animal waste production, (3) frequency of burning, (4) atmospheric fallout dry fallout and precipitation. Existing data indicates that, due to flat slope, slow runoff rates and lack of fines in soil of the basin, P transport is not closely associated with sediment transport. Also PO_4 is predominant species since ratios of PO_4 to TP is relatively constant, analysis of alternatives of management could be made by simulating Ortho-P transport, decoupled from sediments.

Additional Comments
No data. General comments only on hydrological simulation program to model Kissimmee River.

Nico, L. G., and A. M. Muench. 2004. Nests and nest habitats of the invasive catfish Hoplosternum Littorale in Lake Tohopekaliga, Florida: A novel association with non-native Hydrilla Verticillata. Southeastern Naturalist 3:451-466.

Reference ID: 546

Keywords: Lake Tohopekaliga/Fish/Hydrilla

Abstract: Hoplosternum littorale is a South American catfish (Family Callichthyidae) first discovered in the United States in 1995 in Florida. The presence of H. littorale was documented from early 2002 to late 2003 in Lake Tohopekaliga (Kissimmee River Basin) in central Florida. In this paper, 22 H. littorale nests and nest sites are described. The characteristic bubble nests were present from late May to early September, with number of nests peaking in August when water stage and temperature were both high. Nest habitats (shallow, open marshes) and timing of nest construction (rainy season) were similar to what has been reported for H. littorale in its native range. Most nests (n = 14) were in areas dominated by Hydrilla verticillata and constructed largely from parts of this Asian aquatic plant, representing a unique association between two non-native species. Nevertheless, during August, as water levels increased, nesting shifted from H. verticillata-dominated communities to use of inshore grass zones dominated by Luziola fluitans. Knowledge of H. littorale nesting seasonality and habitat preferences may be useful for any efforts to control or manage this invasive fish.

Nnadi, F. N., and D. Addasi. 1999. Estimating phosphorus removal in lakes using marsh wetlands. Journal of Environmental Science and Health, Part A - Toxic/Hazardous Substances & Environmental Engineering 34: 405-422.

Reference ID: 523

Keywords: General/Wetland/Phosphorus assimilation

Abstract: The objective of this study was to develop a modified simplest seasonal model that predicts phosphorus removal efficiency for lakes using marsh wetland system using lake waters. The proposed model calculates the wetland removal efficiency and total outflow phosphorus (TPout) concentration as a function of the soluble and nonsoluble reactive phosphorus (SRP and NSRP respectively) while considering the accumulation mechanisms. The observed and predicted TPout concentrations compared reasonably which suggest that empirical models can be adapted to estimate the phosphorus removal efficiency of the marsh wetlands. The results also indicate that TPout concentrations decreased exponentially with time through the wetland and decreasing the surface hydraulic loading rate of the system would increase the removal efficiency of

phosphorus. It was observed that about 78% of the total phosphorus and 77% of the soluble phosphorus content within the water column was removed with about 19% of the total phosphorus removed within the first 5 days (13% of the system detention time).

Nordlie, F. G., T. Gayle, M. Brown, L. Burns, J. Browder, E. Debellevue, T. D. Fontaine III, D. Grocki, R. Guiterrez, T. Morris, M. Sell, and L. Shapiro. 1975. Water quality models for understanding potential eutrophication in Lake Okeechobee, Florida, USA. University of Florida, Center for Wetlands, Gainesville, Florida, USA.
Reference ID: 234
Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/Cypress Lake/Lake Hatchineha/Lake Kissimmee/East Lake Tohopekaliga/Osceola County/Highlands County/Orange County/Water Quality/Nutrients/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Evaluates a series of management alternatives for the utilization of water and surrounding watersheds showing potential impacts of each on water quality and which provide cost-benefit analysis of each a series of alternatives for the water uses.

Study Conclusions
The Kissimmee River due to great flow and Taylor Creek die to high concentrations constitute two principle sources (point) of P. Computer model simulation of P dynamics in Kissimmee Upper Chain of Lakes suggests that under present lake level regulation scheme the lakes act as phosphorus sinks resulting in better quality of water being discharged from each that would be the case under an unaltered hydroperiod. Lake Tohopekaliga is hypereutrophic and receives heavy nutrient load from at least 5 sewage treatment plants- load rate of 1.4 g/m2/yr. The lake, however, does not discharge dangerous load of P downstream, rather acts as an efficient sink. P concentrations shown to be highest from urban and improved pasture while lower for unimproved pasture and rainfall. P model highly correlated to actual output levels. Analyzing the implications of management alternatives, when the lakes are regulated, retaining more P, one lake reaches extremely high levels followed by restoring one at a time. When left to respond naturally, the lakes in the chain move up the trophic scale in a more even fashion.

Additional Comments
Extensive summary of physical and chemical and biological features of Lake Okeechobee. Series of 25 stations located in 5 lakes. Nutrient budgets and energy budget.

Nordstedt, R. A., and L. B. Baldwin. 1973. Lagoon disposal of dairy wastes in Florida. American Society of Agricultural Engineers, St. Joseph, Michigan, USA.
Reference ID: 235
Keywords: Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

____. 1974. Sludge accumulation and stratification in anaerobic dairy waste lagoons. Unpublished report on file in St. Joseph, Michigan, USA.

Nordstedt, R. A., L. B. Baldwin, and C. C. Hortenstine. 1971. Multistage lagoon systems for treatment of dairy farm waste. Pages 77-80 in Americal Society of Agricultural Engineers, editor. Proceedings of the internationsl symposium on livestock wastes. Americal Society of Agricultural Engineers, St. Joseph, Michigan, USA.
Reference ID: 237
Keywords: Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson **(editor, place and date missing)**

Noss, R. F., E. T. LaRoe III, and J. M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. U.S. Department of the Interior, National Biological Survey, Washington, D.C., USA.

Reference ID: 513
Keywords: KCOL/Robert Pace/Ecosystems/Degradation
Notes: Recorded by Brent Anderson 5/24/2005

This report discusses why the dry prairie habitat that surrounds some of the lakes is considered to be one of the most endangered communities in the U.S.

O'Dell, K. M. 1994. Water quality in the Shingle Creek Basin, Florida, before and after wastewater diversion. Journal of Environmental Quality 23:563-571.
Reference ID: 442
Keywords: Brad Jones/KCOL

O'Dell, K. M., J. VanArman, B. H. Welch, and S. D. Hill. 1995. Changes in water chemistry in a macrophyte-dominated lake before and after herbicide treatment. Lake and Reservoir Management 11:311-316.
Reference ID: 443
Keywords: Lake Istokpoga/Vegetation/Brad Jones/KCOL
Abstract: Lake Istokpoga is the fifth largest freshwater lake in Florida, and is widely renowned for its abundance of sportfish. By 1988, an infestation of the exotic aquatic weed hydrilla, had severely impacted many water related functions on Lake Istokpoga. Beginning in 1988, the lake was treated with fluridone to control hydrilla. Five years (1988-1992) of water chemistry data are presented in this paper, representing pre- (Feb.-Dec. 5, 1988) and post- (Dec. 20, 1988-Dec. 1992) herbicide application periods. Trophic state variables were calculated to characterize lake condition. Reductions in hydrilla populations through herbicide treatments caused increases in total phosphorus and chlorophyll a concentrations, and decreases in Secchi depth. No significant increases in the total nitrogen concentrations were observed between the before and after treatment periods. Fluridone treatment of Lake Istokpoga cost approximately $3.7 million (through 1992), and was only temporarily effective at controlling hydrilla.

____. 1995. Changes in water chemistry in a macrophyte-dominated lake before and after herbicide treatment. Lake and Reservoir Management 11:311-316.
Reference ID: 586
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Odum, H. T. 1953. Disolved phosphorous on Florida waters. Florida Geological Survey, Tallahassee, Florida, USA.
Reference ID: 238
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Kissimmee River/Okeechobee County/Glades County/Polk County/Osceola County/Highlands County/Orange County/Fisheating Creek/Indian Prairie Canal/C-40/Josephine Creek/Taylor Creek/Lake Istokpoga/Reedy Lake/East Lake Tohopekaliga/Lake Tohopekaliga/Water Quality/Nutrients/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Purpose of this study was to analyze representative samples of all kinds of Florida surface waters for dissolved P and to determine what relationships there are between; dissolved P and the type of geological rock formations underlying the area; between dissolved P and the type of water body; between dissolved P in Florida and in other regions of the world; between dissolved P and the process of formation of phosphate rock; between dissolved P and the growth of aquatic organisms such as plants and fish; between dissolved P and the increasing problem of stream and estuary pollution and the spectacular red tide.

Study Conclusions

The extensive deposits of phosphoric rock in Florida lead to unusually high dissolved P contents of streams and lakes which drain these areas. Thus waters are of potentially high fertility for aquatic growth. Addition quantities are added by sewage and industry in some areas, although little recognition has been made of the possibly large biological effects that relatively small amounts of added phosphorous can have on those areas which are not receiving drainage from phosphate areas. Moderately low phosphorous content of basic springs in contrast to acid surface streams suggests a controlling role of pH in phosphorous solubility in Florida. It seems likely that percolating rain waters are continually concentrating P in layers just beneath the surface as the acid rainwater becomes basic.

Additional Comments
Data includes dissolved patterns of surface phosphate bearing formations and type of water. Dissolved P in Florida compared to other regions, and the potential fertility; dissolved P and pollution.

Ogburn, R. W., B. W. Breedlove, and A. M. Watson. 1987. Historical flood patterns and vegetation changes along Shingle Creek, Orlando, Florida. Breedlove, Dennis & Associates, Inc., Winter Park, Florida, USA.
Reference ID: 480
Keywords: Chris Carlson/KCOL/Vegetation/Shingle Creek
Notes: Recorded by Brent Anderson 4/26/2005

Ogburn, R. W. III, C. Hanlon, S. W. Gong, and E. Broughton. 1996. Compliance with water quality criteria in a multiple-use lake, Lake Okeechobee, Florida. Lake and Reservoir Management 12:371-380.
Reference ID: 584
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Orange County Planning Department, and Mayes, Sudderth, and Etheredge, Inc. 1981. Southwest Orange County, Florida 201 Facilities Plan. Orange County Panning Department and Mayes, Sudderth, and Etheredge, Inc., Orlando, Florida, USA.
Reference ID: 239
Keywords: LTMP/Kissimmee Basin/Lake Conway/Little Lake Conway/Orange County/Shingle Creek/Water Quality/Nutrients/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
201 facilities plan

Study Conclusions
Section II. B.8 summarizes existing wastewater management systems within 201 area.

Additional Comments
Includes existing domestic wastewater systems, flow and summary of effluent quality, industrial wastewater systems. Monthly data for selected users.

Orange County Pollution Control Department. 1973. Boggy Creek revised water quality report. Orange County Pollution Control Department, Orlando, Florida, USA.
Reference ID: 481
Keywords: LTMP/Kissimmee Basin/Osceola County/Orange County/Boggy Creek/Lake Conway/Mare Prairie Slough/Water Quality/Nutrients/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Purpose to delineate water quality relating to land usage and pollution sources within Boggy Creek Drainage Basin.

Study Conclusions
Data indicates that the lakes and streams comprising the Boggy Creek Drainage Basin are in a stressed

condition due to development within the basin, several point sources contributing significant amounts of pollutants to the stream proper and passing downstream to the Kissimmee Basin. Mare Prairie and Boggy Creek are polluted due to drainage received from agriculture sources and the discharge from domestic waste treatment plants. Quality in 3 lakes of the Conway chain are good. Water quality from Mare Prairie indicates large amounts of organic and nutrient pollution has been accumulating in lake due to agriculture runoff. Gross pollution at McCoy road station.

Additional Comments
Data includes nutrients, physical and miscellaneous parameters, Bac-T and bentics. 25 lakes documented are listed in this basin. Contains raw data, averages and range, domestic waste plants and discharge volumes.

____. 1973. Shingle Creek revised water quality report. Orange County Pollution Control Department, Orlando, Florida, USA.

Reference ID: 240

Keywords: LTMP/Kissimmee Basin/Osceola County/Orange County/Shingle Creek/Lake Conway/Mare Prairie Slough/Water Quality/Nutrients/Brad Jones

Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Study objective is to determine from background data the existing biological, chemical and physical condition of Shingle Creek.

Study Conclusions
There is ample evidence of nutrients present indicated by hyacinth and other aquatic weeds. There are large qualities of pollutants still being discharged to stream and not completely assimilated. The natural background data at McLeod Rd. has average of BOD (2.5mg/l) DO (5.5 mg/l) Total P (0.062 mg/l). Calculation indicate during low flow (0.3 MGD at McLeod Rd) and (0.6 MGD at sand lake road) plus flow from Orlando STP. Biological surveys indicate gross pollution (organic) from Orlando STP outfall and Orange County STP. Sewage plant, outfalls measured in Shingle Creek (downstream of outfall) demonstrated excessively high N and P levels. It can be concluded the two wastewater treatment plants are adding organic and inorganic pollutants to the stream causing marked effects between McLeod and Vineland Roads.

Additional Comments
Samples are 24 hour composite samples and grab samples. Background data assessed as quality of site just upstream of first discharge point. Data includes average values and range. Bac-T data. Nutrients summary by sample station. Spatial concentration (miles upstream of Lake Tohopekaliga.

Pan, Y. H., T. L. Steohens, and R. H. Patton. 1981. Heavy metal and pesticide scans of water and sediment from upland detention/retention demonstration project sites. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Reference ID: 241

Keywords: LTMP/Kissimmee Basin/Orange County/Ash Slough/Kissimmee River/Peavine Pasture/Armstrong Slough/Wildcat Slough/Otter Creek/Water Quality/Nutrients/Brad Jones

Notes: Recorded by Brent Anderson 4/27/2005

Study Conclusions
Dibutylphthalate (6.2 µg/L) was found in one water sample at Otter Creek. It could be concluded that no identifiable pollution trends would be detected from the analytical data since the surface waters in the entire survey area was quite low in heavy metal concentrations. Fe was the most common metal found, and increased in sediments towards Lake Okeechobee.

Parker G.G., G. E. Ferguson, and S. K. Love, and others. 1955. Water resources of Southeastern Florida with special reference to the geology and groundwater of the Miami area. U.S. Department of the Interior, Geological Survey, Washington, D.C., USA.

Reference ID: 242
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Glades County/Okeechobee County/Highlands County/Kissimmee River/Fisheating Creek/Indian Prairie Canal/C-40/Arbuckle Creek/Istokpoga Canal/Taylor Creek/Water Quality/Nutrients/Brad Jones
Notes: Recorded by Brent Anderson 4/27/2005

There are many other authors in report (about 50), they are listed in preface of the report

Brief Description of Study
(1) To determine quality and quantity of water available in geologic formations and in lakes, streams and canals. (2) Determine sources of various waters, removal rates by artificial and natural means, rates and areas of replenishment (3) Determine direction and amount of flow of underground waters and surface streams (4) Determine thickness and extent of water bearing formations and hydrological characteristics (5) Determine sources and rates of movement of any intrusion salt water. (6) Determine danger to Miami wellfield salt water intrusion (7) Locate potential potable water areas for development. (8) Map water table fluctuations and present graphically hydrologic characteristics.

Study Conclusions
Surface waters that discharge into Lake Okeechobee from north and west are soft, low in dissolved mineral matter, and highly colored. Kissimmee sampling show little variation in concentrations of any chemical constituent throughout the year. Soft water, highly colored with organics at 110.

Additional Comments
Contains water quality information- Upper and Lower Kissimmee Basin. No nutrient information except NO_3. Information primarily geologic and hydrologic in nature, however =, surface water and quality is given time in a section.

Paukert, C. P., D. W. Willis, and R. S. Holland. 2002. Sample size requirements for in situ vegetation and substrate classifications in shallow, natural Nebraska lakes. North American Journal of Fish Management 22:1329-1333.
Reference ID: 631
Keywords: Vegetation/Method/Vegetation type/Accuracy/Percentage cover/Typha/Scirpus/Potamogeton/Myrophyllum/Certophyllum/Coontail
Notes: Recorded by Brent Anderson 6/02/2005

Perrin, L. S., M. J. Allen, L. A. Rowse, F. Montalbano III, K. J. Foote, and M. W. Olinde. 1982. Effects of a flood control project on duck and coot utilization. Pages 6-30 in L. S. Perrin, M. J. Allen, L. A. Rowse, F. Montalbano III, K. J. Foote, and M. W. Olinde, editors. A report on fish and wildlife studies in the Kissimmee River Basin and recommendations for restoration. Florida Game and Fresh Water Fish Commission. Kissimmee Basin Wetland Investigation.

____. 1982. A report on fish and wildlife studies in the Kissimmee River Basin and recommendations for restoration. Florida Game and Fresh Water Fish Commission, Okeechobee, Florida, USA.
Reference ID: 446
Keywords: Brad Jones/KCOL

Perrin, L. S., M. J. Allen, L. A. Rowse, F. Montalbano III, K. J. Foote, and M. W. Olinde. 1982. Survey of selected ciconiiform and gruiform birds. Pages 31-49 in L. S. Perrin, M. J. Allen, L. A. Rowse, F. Montalbano III, K. J. Foote, and M. W. Olinde, editors. A report on fish and wildlife studies in the Kissimmee River Basin and recommendations for restoration. Florida Game and Fresh Water Fish Commission. Kissimmee Basin Wetland Investigation.

Pfischner, F. L., Jr. 1968. Relation between land use and chemical characteristics of lakes in Southwestern Orange County, Florida, USA. U.S. Department of the Interior, Geological Survey, Washington D.C., USA.
Reference ID: 243
Keywords: LTMP/Kissimmee Basin/Orange County/Little Sand Lake/Water Quality/Nutrients/Brad Jones

Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
Representative random sampling of lakes in southwest Orange County was conducted during May November 1966 on 71 lakes. Purpose was to obtain data on the physical and chemical characteristics of lakes, to find if a correlation exists between certain physical and chemical parameters and to determine if the information can be used to define the hydrologic relation between lakes and groundwater in Orange County.

Study Conclusions
Analysis of selected physical and chemical parameters of these lakes reveals a fair correlation between quality and land use practices. Physical features such as lake size, drainage basin size and the presence of inlets or outlets appear to have no determinable effects on water quality. Specific conductivity of lakes have a log-normal distribution with a range from 40-550 µmhos. No appreciable areal difference was found on Lake Little Sand for temperature and specific conductivity due to incomplete mixing of water. Average specific conductivity of lakes was 136µmhos. Sulfate was the major mineral constituent in most of the samples. This report concluded that the higher conductivity values were caused by higher sulfates which are probably due largely to the frequent application of sulfur on surrounding citrus groves to control spider mites. The sulfur reaches the lakes directly as windblown spray, or indirectly through surface and groundwater discharge. The fact that a lake is confined or unconfined at most stages does not appear to have a great affect in the quality of lake water. This author found it interesting and possibly significant that the conductance data for the sampled lakes in Orange County follow a log-normal distribution. The high degree of variation in the conductance data for the lakes sampled may be due partially to differences in the aquifer materials adjacent to a particular lake; however, it appears that most of the variation is related to local land use practices.

Additional Comments
Contains water quality information- Upper and Lower Kissimmee Basin. No nutrient information except NO_3. Information primarily geologic and hydrologic in nature, however, surface water and quality is given time in a section. &1 lakes sampled, but not identified.

Phelps, G. G. 1978. Chemical quality of water used for municipal supply in Florida. (Map). U.S. Department of the Interior, Geological Survey.

____. 1982. Hydrology of Lake Tohopekaliga, Osceola County, Florida. U.S. Department of the Interior, Tallahassee, Florida, USA.

Reference ID: 245

Keywords: LTMP/Kissimmee Basin/Lake Tohopekaliga/Lake Weohyakapka/Lake Hatchineha/Lake Pierce/Lake Marion/Lake Mary Jane/Alligator Lake/Lake Cypress/East Lake Tohopekaliga/Lake Marian/Lake Rosalie/Polk County/Orange County/Osceola County/Water quality/Groundwater/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/27/2005

Brief Description of Study
The purpose of the study was to provide general hydrology, geologic and water quality data specific to Lake Tohopekaliga. Water quality data record from 1954-1977 with actual study between 1979-1980. The new data collected between 1979-1980 included measurement of lake bottom elevations, measurement of thickness of lake bottom detritus and collection of 5 sediment samples, lake 21 diel DO monitoring.

Study Conclusions
(1) Groundwater movement in the Florida Aquifer west to east; (2) Pesticide residues of lake bottom sediments does not appear to have occurred. (3) Statistically significant inverse relationship between specific conductivity and lake stage and dissolved solids and lake stage, but variation in lake stage by itself only explains about 33% of variation in dissolved solids and `17% of specific conductivity variation since 1954. specific conductivity has increased since 1954 and inclusion of both stage and date in a linear equation explained ~54%. (4) Sources of P to lake include deposits of phosphate pebbles and P mining

operations, human wastes, detergents, industrial and urban drainage, Agriculture areas, feedlots and atmospheric fallout. N sources also given; (5) nutrient concentrations for Lake Tohopekaliga generally higher than comparison lakes. Particularly P (0.30 mg/L). Relatively high background P loads noted by others for Shingle Creek (2.0 mg/L) which may be result of P deposits in soils. Based on Obum (1953) data higher propensity if P from phosphate mining area to reach Lake Cypress (via Reedy Creek) then to reach Lake Tohopekaliga and only during high flow there appears to be a significant increase in P over time based on long term data for Lake Cypress. Total N, organic C and NH_4 do not show some trend. Low DO doesn't appear to be a problem with Lake Tohopekaliga. Highest TON levels (1.8 mg/L) at south end of lake and lowest (1.1 mg/L) at St. Cloud outlet. P was highest (1.1 mg/L) at north end and lowest in east arm of lake, generally decreases as proceed south.

Additional Comments

Report describes the geographic setting, geology and groundwater conditions. Report contains approximate water budget. Sediments analyzed for nutrients and pesticides. Data is available for 1 surficial well. All samples are depth integrated. Data also available, comparatively for other lakes. P/R ratios are given.

Pruitt, B. C., and S. E. Gatewood. 1976. Kissimmee River floodplain vegetation and cattle carrying capacity before and after channelization. Division of Administration, Tallahassee, Florida, USA.

Reference ID: 246

Keywords: Kissimmee River/Floodplain/Vegetation/Nutrients/Water quality/Brad Jones/KCOL

Notes: Brent Anderson

L. R. Isabell and Associates, Inc. 1969. Comprehensive planning study, Polk County, Florida: Water and wastewater facilities, rural areas. L. R. Isabell and Associates, Inc, Place of publication unknown.

Reference ID: 221

Keywords: Comprehensive planning/Polk County/Water management/Wastewater facilities/Rural areas/Watsewater/Facilities/Brad Jones/KCOL

Notes: Brent Anderson **(place of publication unknown)**

Reckhow, K. H., and N. G. Aumen. 1997. Uncertainty analysis and simulation modeling for Lake Okeechobee research prioritization. Lake and Reservoir Management 13:44-48.

Reference ID: 582

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 5/31/2005

Reckhow, K. H., K. S. Korfmacher, and N. G. Aumen. 1997. Decision analysis to guide Lake Okeechobee research planning. Lake and Reservoir Management 13:49-56.

Reference ID: 583

Keywords: Brad Jones/Water quality

Notes: Recorded by Brent Anderson 5/31/2005

Reddy, K. R., E. Flaig, L. J. Scinto, and O. D. T. A. Diaz. 1996. Phosphorus assimilation in a stream system of the Lake Okeechobee basin. Water Resource Bulletin 32:901-915.

Reference ID: 515

Keywords: Taylor Creek/Nubbin Slough/Phosphorus assimilation

Abstract: The ability to predict how streams and wetlands retain ***phosphorus*** (P) is critical to the management of watersheds that contribute nutrients to adjacent aquatic systems such as lakes. Field and laboratory experiments were conducted to determine the P assimilatory capacity of a stream (Otter Creek) in the Taylor Creek/Nubbin Slough Basin located north of ***Lake Okeechobee***, Florida. Dominant soils in this basin are sandy Spodosols; landuse is primarily dairy farms and beef cattle pastures. Estimates of P ***assimilation*** show that sediments assimilate approximately 5 percent of the P load. ***Phosphorus assimilation*** rates in the stream were estimated using first-order relationships based on the total P concentration of the water column as a function of

distance from the primary source. This method assumes minimal lateral inputs. Stream lengths required for one turnover in P ***assimilation*** were estimated to be in the range of 3-16 km. Laboratory studies using intact sediment cores indicated a P ***assimilation*** rate of 0.025 m/day, and equilibrium P concentration of 0.16 plus or minus 0.03 mg/L in the water column. Dissolved P concentration gradients in the sediments showed upward flux of P at water column P concentration of <0.16 mg/L. Approximately 56-77 percent of the P assimilated in the above-ground vegetation during active growth was released or translocated within six months of senescence, suggesting short-term storage in above-ground vegetation. Bottom sediments and recalcitrant detrital plant tissue provide for long-term P assimilation in the creek. Although stream sediments have the potential to adsorb P, high flow rate and low contact period between water and sediment limits this process.

Reddy, K. R., G. A. O'Connor, and P. M. Gale. 1998. Wetland and aquatic processes: Phosphorus sorption capacities of wetland soils and stream sediments impacted by dairy effluent. Journal of Environmental Quality 27:438-447.

Reference ID: 558

Keywords: Taylor Creek/Nubbin Slough/Phosphorus assimilation

Abstract: The ability of stream sediments and adjacent wetlands to retain added P depends on the P sorption capacity and physico-chemical properties of sediments or wetland soils. The objectives of this study were to: (i) determine the potential P sorption capacities of wetland soils and stream sediments in systems with distinctly different P loadings, and (ii) establish the relationship between P sorption capacity and selected physico-chemical properties. Batch sorption isotherms were measured under aerobic and anaerobic conditions for sediments and wetland soils along a stream-wetland-upland continuum at two sites in the Lower Kissimmee River Basin and Taylor Creek/Nubbin slough of the Okeechobee Basin, Florida. Soluble P and equilibrium P concentrations (EPC) of stream sediments generally decreased along the wetland-upland continuum. The EPC values were about twofold greater under anaerobic conditions than aerobic conditions; however, P sorption capacities decreased by about 35% under anaerobic conditions compared with aerobic conditions. The P sorption maxima, estimated by a single point isotherm measured at an added P level of 1000 mg P kg super(-1), correlated well with Langmuir adsorptive maxima. Phosphorus retention by stream sediments and wetland soils was strongly correlated with contents of amorphous and poorly crystalline forms of Fe and Al, which explained 87% of the variability in P retention maximum. Addition of total organic C to predictive equations improved the predictability by only 5%.

Redfield, G. W. 1998. Quantifying atmospheric deposition of phosphorus: A conceptual model and literature review for environmental management. Technical Publication WRE #360. South Florida Management District, West Palm Beach, Florida, USA.

Reece, D., R. Belles, and M. Brown. 1984. Hydrogeologic data collected from the Kissimmee planning area. Technical Publication No. 84-2. South Florida Water Mangaement District, West Palm Beach, Florida, USA.

Richardson, C. J., and S. S. Oian. 1999. Long-term phosphorus assimilative capacitiy in freshwater wetlands: A new paradigm for sustaining ecosystem structure and function. Environmental Science & Technology 33:1545-

1551.

Reference ID: 543

Keywords: General/Phosphorus assimilation/Wetland

Abstract: Statistical analysis of a North American Wetland Database (NAWDB) allowed us to develop a mass loading model that was used to separate P assimilative capacity (defined as P absorption with no significant ecosystem change and no elevated P output) from storage capacity (maximum storage) in wetlands. Our analysis indicates that, given ample supplies of other nutrients, average P assimilative capacity (PAC) in North American wetlands is near 1 g m(-2) yr(-1). From this analysis, we proposed a "One Gram Assimilative Capacity Rule" for P loadings within natural freshwater wetlands if long-term storage of P, maintenance of community structure and function, and low P effluent concentrations are required. An Everglades test site supports our hypothesis that natural wetlands will lose native species, become P saturated in a few years, and export unacceptable amounts of phosphate when phosphorus loading exceeds PAC. Moreover, our findings clearly demonstrate that even P-limited wetlands have the capacity to assimilate low levels of P loadings without significant changes in ecosystem structure and function.

Rosendahl, P. C. 1976. Physical and water quality aspects of meandering and channelized streams-Orthophosphate model in Kissimmee River, Florida, USA: Case study. P.h.D. dissertation. University of Miami, Coral Gables, Florida, USA.

Reference ID: 247

Keywords: LTMP/Kissimmee Basin/Kissimmee River/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

Comparisons were made between Ortho-P rates of movement in a canal and a meandering stream. The meandering stream had greater algal and macrop uptake rates and lower plankton and sediment releases comparatively. Chemical precipitation and direct rainfall were insignificant relative to other terms. Major source of P to both systems was upland runoff. The impact of this source was greater in meandering system due to smaller channel volume. When secondary effects of meandering were considered such as marsh inundation, net Ortho-P movement within meandering channel was less than that for the canal due to lower concentrations of P in marsh effluent. Meandering stream found to have dispersion coefficient over 17x's that measured for canal while both systems had equal velocities. Notes of Ortho-P movement were combined to single mass transport equation. Internal river and canal channel processes were overshadowed by external point source loads. An important source of Ortho P is due to sediment release. Primary source of P is runoff.

Additional Comments

Some loading data available for lake inflows in Joyner, 1974.

Rosendahl, P. C., and T. D. Waite. 1978. Transport characteristics of phosphorous in channelized and meandering streams. Water Resources Bulletin 14:1227-1238.

Reference ID: 248

Keywords: LTMP/Kissimmee Basin/Kissimmee River/Glades County/Highlands County/Okeechobee County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

Comparisons were made between rates of movement of Ortho-P in a canal and meandering stream.

Study Conclusions

The meandering system had greater algal and macrophyte P uptake rates and lower plankton and sediment release rates compared to the canal. Chemical precipitation and direct rainfall influences on Ortho-P were insignificant relative to other terms. Major source of P from upland runoff. The impact of this source greater in meandering system due to smaller channel volume. When secondary effects of meandering were considered such as marsh inundation, the net Ortho-P movement within the meandering channel were < that for the canal, due to lower P concentrations in marsh effluent water

Additional Comments
Mathematical model of Ortho-P (using distinct monthly data) to compute Ortho-P vs. distance during wet and dry season for channel and meandering river. No raw data, no loads.

Runde, D. E. 1991. Florida atlas of breeding sites for herons and their allies: 1986-1989 update. Nongame Wildlife Program Technical Report No. 10. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Sawicki, A. T. 1977. Background water quality analysis of Lake Conway, Florida, USA. Final Report. Page unknown in W. E. S. U.S. Army Corps of Engineers, editor. Proceedings of the research and planning conference on the aquatic plant control program. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA.
Reference ID: 249
Keywords: LTMP/Kissimmee Basin/Kissimmee River/Glades County/Orange County/Lake Gatlin/Little Lake Conway/Lake Conway/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Study Conclusions
(1) Lake Gatlin quality varies significantly from time to time and its water quality is somewhat poorer than that in the four lobes in Lake Conway. pH and alkalinity-no significant seasonal trends; (2) Water quality at Lake Gatlin varied widely between 72-76. Seems to be inverse relationship between DO and carotenoids (3) Data suggests that quality in Lake Conway has changed little since 1972. Seasonal changes, however, do occur.

Additional Comments
Report uses Orange County DPC data. Data includes DO, BOD, pH, Alkalinity, T-P, Organic N, Chlorophyll a, and carotenoids.

Schelske, C. L., F. J. Aldridge, and W. F. Kenney. 1999. Assessing nutrient limitation and trophic state in Florida lakes. Pages 321-339 in K. R. Reddy, G. A. O'Connor, and C. L. Schelske, editors. Proceedings of the Symposium on Phosphorus biogeochemistry in subtropical ecosystems. Lewis Publishers, Boca Raton, Florida, USA.
Reference ID: 556
Keywords: Lake Apopka/Lake Okeechobee/Phosphorus

Schindle, D. W. 1974. Eutrophication and recovery in experimental lakes: Implications for management. Science 184:897-899.
Reference ID: 250
Keywords: Eutrophication/Recovery/Experimental lakes/Lakes/Management/Lake management/Nutrients/Water quality/Brad Jones/KCOL
Notes: Brent Anderson

Schomer, N. S., and J. G. Hand. 1980. Total maximum daily load (TMDL) prototype methodology development. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.
Reference ID: 251
Keywords: LTMP/Santa Fe River/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

The intent of this study was to develop a watershed management perspective that will lead to valid determination of total maximum daily loads and document access to existing sources of information pertinent to determining TMdL's

Study Conclusions
N/A

Additional Comments
No raw data, but good review of method development. Discussion uses Santa Fe River system as an example.

Schoof, N. S., and J. W. Nancy. 1976. On-site runoff depletion at three impoundments. Journal of Soil and Water Conservation 31: 67-73.
Reference ID: 252
Keywords: Water quality/Nutrients/ Brad Jones/KCOL
Notes: Brent Anderson

Schulz, E. J., M. V. Hoyer, and D. E. Canfield, Jr. 1999. An index of biotic integrity: A test with linmological and fish data from sixty Florida lakes. Transactions of the American Fisheries Society 128:564-577.
Reference ID: 564
Keywords: Surface area/Fish
Abstract: An index of biotic integrity (IBI) that used 8 fish assemblage metrics was examined for effectiveness in estimating anthropogenic impacts to 60 Florida lakes ranging in size from 2 ha to more than 12,400 ha. The lakes ranged in trophic status from oligotrophic to hypereutrophic and had aquatic macrophyte abundances (percent lake volume infested) ranging from less than 1% to 100%. Fish species were classified by trophic feeding guild and tolerance to increases in turbidity or warming and decreases in dissolved oxygen concentration. Fish assemblage metrics tested were as follows: number of fish species, number of native fish species, number of Lepomis species, number of piscivorous species, number of generalist species, number of invertivore species, number of species intolerant of increased turbidity or warming and decreased dissolved oxygen concentration, and number of species tolerant of increased turbidity or warming and decreased dissolved oxygen concentration. The total IBI scores and the data used to calculate individual metrics were unable to accurately predict the degree of anthropogenic impact to 60 Florida lakes, as estimated by personal observations of local limnologists, lake chloride concentrations, and road densities in the watersheds. Lake surface area and lake trophic status have a dominant influence on the fish assemblage metrics tested in this study. Thus, the IBI approach may be of limited usefulness for predicting anthropogenic impact in lake data sets that have wide ranges of surface areas and trophic status classifications.

Schwartz, L. N., and T. Heiker. Date unknown. Lake Munson Restoration Project Leon County, Florida. Camp Dresser & McKee Inc., Maitland, Florida, USA.
Reference ID: 495
Keywords: Brad Jones/Chris Carlson/KCOL/nutrients
Notes: Recorded by Brent Anderson 5/4/2005

Chris Carlson personal copy
Abstract: The overall goal of the Lake Munson Restoration Program is to restore the Lake Munson system to a more natural state. Lake Munson will be improved with dredging, access improvements, habitat restoration, and sediment reduction. Restoration of Lake Munson will not be implemented until improvements

upstream of Lake Munson include excavation of the "delta", improvements to Munson Slough, restoration of the Lake Henrietta basin, excavation of an attenuation pond and installation of trash racks. These improvements will be implemented in a manner that will enhance the function of the project area. The delta has formed at the confluence of Munson Slough and Lake Munson and has an area of approximately 29 acres. The delta will be excavated and the surface water inflow to Lake Munson will be restored to a more natural state. Improvements to Munson Slough include realignment, regarding and stabilization of channel banks for erosion control. Restoration of the Lake Henrietta basin includes a stormwater attenuation pond and trash racks, an increase in flood storage capacity, and wetland restoration. A diversion ditch has been included the design for flow diversion during construction and for increased flushing in the north arm of Lake Munson, after construction is completed. The improvements, which are necessary for the restoration of Lake Munson, include significant construction activities and long-term maintenance.

Schwartz, L. N., and K. Terry. Date unknown. Lake Munson Restoration Project Leon County, Florida. Camp Dresser & McKee Inc., Maitland, Florida, USA.

Reference ID: 496

Keywords: Brad Jones/Chris Carlson/KCOL/nutrients

Notes: Recorded by Brent Anderson 5/4/2005

Chris Carlson personal copy

Abstract: Once a viable wildlife habitat and recreational site, Lake Munson is now choked with aquatic vegetation, and sediments and trash are blocking the mouth of the lake creating a delta. The Lake Henrietta basin, located upstream of Lake Munson, historically provided stormwater treatment for the natural flow through the system. Channelization through the Lake Henrietta basin and increased stormwater flows, the result of increased development, have led to the creation of the delta and the degradation of Lake Munson. Through more than ten years of investigations, studies, and master planning efforts, Leon County has identified five major objectives of the Lake Munson Restoration Program; to improve the water quality of stormwater entering Lake Munson, to improve the fishery quality and recreational value of Lake Munson, to improve the water quality of the discharge from Lake Munson to downstream waters, and to reduce flooding as much as possible in the Lake Munson system.

Shapiro, A. E., F. Montalbano III, and D. Mager. 1982. Implications of construction of a flood control project upon bald eagle nesting activity. Pages 106-118 in L. S. Perrin, Allen, L. A. Rowse, Montalbano F. III, K. J. Foote, and M. W. Olinde, editors. A report on fish and wildlife studies in the Kissimmee River Basin and recommendations for restoration. Florida Game and Fresh Water Fish Commission. Kissimmee Basin Wetland Investigation.

Shapiro, A. E., F. Montalbano III, and D. Manger. 1982. Implications of construction of a flood control project upon bald eagle nesting activity. Wilson Bulletin 94:55-63.

Reference ID: 323

Keywords: Eagle /Baseline/Birds/Gary Williams/KCOL

Notes: How are the data in this document applicable to the metrics we are evaluating?

Number of bald eagle nests/fledglings

What parameters were monitored?

Number of active territories

Number of young produced

What was the geographic extent of monitoring?

Entire Upper Basin

How many samples or sample locations were monitored?

All territories in the Upper Basin were monitored

What was the sampling frequency and duration (period of record)?

This report summarizes the results of annual surveys during 1962 1971 and 1977 - 1979

Do these data cover the baseline or reference (pre-1960s) period?
Baseline

Who collected the data?
FWC collected 1977 1979. George Heinzman collected 1962 1971.

Where are the data located? (agency or organization maintaining database)
In report

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
QA/QC protocols unknown.

Are raw data and/or summarized data presented in the document?
Summarized

Is a summary of findings presented in the document?
No, this was a note in Wilson Bulletin and didn't have an abstract. The number of active bald eagle territories in the Upper Basin averaged 33.3/yr during 1962 71 and 36.5/yr during 1977 79. The authors hypothesized that the increase in bald eagle pairs stemmed from immigration of eagle pairs displaced from the Lower Basin following completion of Kissimmee River channelization. However, different data collection methods were used during the two time periods in question, so the difference may be an artifact of differing methodologies. Number of bald eagle young produced averaged 1.06/active territory from 1977 1979, which was higher (raw numbers, not statistical tests) than the statewide average of 0.87/active territory.

Shaw, J. E., and S. Trost. 1984. Hydrogeology of the Kissimmee planning area. South Florida Water Management District, West Palm Beach, Florida, USA.

Sheffield, C. W. 1970. Lake Apopka and aquatic weeds. Hyacinth control journal 8:45-47.
Reference ID: 527
Keywords: Lake Apopka/Vegetation/Hyacinth

Sheffield, C. W., W. M. Bishop, and C. Lotspeich. 1982. Effluent disposal into wetlands. Pages 355-368 in P. M. McCaffrey, T. Beemer, and S. E. Gatewood, editors. Preceedings of the progress in wetlands utilization and management symposium. Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins, Tallahassee, Florida, USA.
Reference ID: 253
Keywords: LTMP/Kissimmee Basin/Orange County/Osceola County/Buenaventura Lakes/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
This paper discusses the use of freshwater wetlands as a means of effluent disposal of treated wastes.

Study Conclusions
Six months sampling of Lake Buenaventura wetland (Cypress) indicates natural background levels-chloride = 28-36 mg/l, Total N = 2.18-2.54 mg/L, Total P = 0.05-0.06 mg/L and BOD of 2-2.6 mg/L. These values are very typical of a freshwater swamps (Cypress) in Central Florida.

Additional Comments
Maintaining of Sky Lake will begin in 1981. Report describes types of treatment plants, capacity, and effluent disposal methods. Monitoring of Buenaventura Lakes sites was begun in 1979.

Shih, S. F., A. F. Federico, J. F. Milleson, and M. Rosen. 1978. Sampling programs for using upland marsh to improve water quality. Techical Paper No. 78-2050. Americal Scociety of Agricultural Engineers, St. Joseph, Michigan, USA.

Shih, S. F., and D. W. Hallett. 1974. Impact of upland marsh on water quality, Preliminary report. Central and Southern Florida Flood Control District, West Palm Beach, Florida, USA.

Reference ID: 255

Keywords: LTMP/Kissimmee Basin/Okeechobee County/Chandler Slough/Cypress Slough/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

This was a pilot area of marsh and swamp to (1) determine the rate and quantity of nutrient uptake in marsh and swamps under natural flow conditions (2) to provide data point vs. quantity and quality (3) study the interaction of travel time distance flow depth and quality (4) investigate flow patterns (5) survey major plant communities (6) determine rainwater nutrient input. A limited investigation of nutrient sources was also to be conducted to determine the interaction between drainage ditch density and nutrient source in two portions of the drainage basin, Cypress and Chandler Slough, and to determine the interaction of land practices, animal numbers and fertilizer application rates on nutrient input.

Study Conclusions

Preliminary results: Ortho-P and Total P concentrations versus time through 1302 bridge (from Ash and Gore Sloughs) seems more stable and less enriched than that at 1301. This may imply land use cause. The PO_4 content at outflow of Chandler Slough is less than inflow implying that the marsh has a potential to reduce P concentrations. Ortho P averaged 30% lower marsh than above. The ratio OPO_4 to $T\text{-}PO_4$ increased 6% in marsh, 5% in swamps. Results imply both marsh and swamp may have the capacity to cleanse OPO_4 and particulate P. $T\text{-}PO_4$, P and T-Particulate P were reduced 64% in marsh, 15% in swamp.

Additional Comments

There is raw data, but data is based only upon 3 days of study.

Shih, S. F., D. W. Hallett, and R. L. Hamrick. 1974. Analysis of Kissimmee River flows for water quality effects. Presentation to the international seminar and exposition on water resources instrumentation. International Water Resources Association and the Americal Society of Civil Engineers, Chicago, Illinois, USA.

Reference ID: 256

Keywords: LTMP/Kissimmee Basin/Glades County/Orange County/Okeechobee County/Kissimmee River/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

This paper covered a “first cut” approximation of two separate items of study. First dealt with the development of a calculation technique to measure a river marsh system as a water quality treatment facility, based on water quality only. The second part relates to initial analysis of water quality. The pollutant sources include sewage treatment effluent and urban runoff entering lakes in upper basin and runoff from improved pasture adjacent to C-38. Main purpose was to analyze the Kissimmee River flood plain as a treatment facility with the potential for reducing the nutrient content of the water.

Study Conclusions

Results indicate that quality is highly regressed in water quality and the weekly sampling program has a better result than the monthly program. The main sources of nutrients came from local drainage to the river as shown by the analysis of the quality concentrations relative to downstream distance.

Additional Comments

Weekly and monthly raw data and correlation coefficients for model.

Sincock, J. L., J. A. Powell, R. K. Hyde, and H. E. Wallace. 1957. The relationship of the wintering waterfowl

populations of the Kissimmee River Valley to the hydrology, topography, distribution of the vegetation and the proposed hydrological regulations. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 345
Keywords: Birds/Waterfowl/Reference/Gary Williams/KCOL
Notes: Recorded by Brent Anderson 3/23/2005

How are the data in this document applicable to the metrics we are evaluating?
Examines waterfowl populations in relation to habitat characteristics of lakes in the Upper Basin

What parameters were monitored?
Waterfowl populations, waterfowl food plants

What was the geographic extent of monitoring?
Lake Kissimmee, Lake Cypress, Lake Toho, Lake Hatchineha

How many samples or sample locations were monitored?
Waterfowl data were obtained from *Florida Game and Fresh Water Fish Commission. 1957. Recommended program for Kissimmee River Basin, Appendix A: Waterfowl Inventories. A contribution of federal aid projects F-8-R, W-19-R, and W-39-R.* Vegetation data were collected from approximately 40 transects on Lake Kissimmee, Lake Cypress, Lake Toho, Lake Hatchineha. Dates of vegetation data collection were not reported, but vegetation data were compared to hydrologic conditions from 1951 56.

What was the sampling frequency and duration (period of record)?
Unknown.

Do these data cover the baseline or reference (pre-1960s) period?
Reference

Who collected the data?
FWC

Where are the data located? (agency or organization maintaining database)
It is unknown if the raw data are still available.

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Summarized.

Is a summary of findings presented in the document?
No summary is given. The authors make the point that there is a positive correlation (0.78) between number of duck days and amount of water level fluctuation on lakes, noting that increases from low water levels in late summer to higher levels in winter are associated with higher waterfowl numbers. The authors also noted that proposed regulation schedules would likely result in a decrease in the availability of important waterfowl food plants, such as smartweed.

Sinha, L. K., and N. Khanal. 1971. Estimation of rainfall for the Kissimmee River basin. Technical Memorandum. Central and South Florida Flood Control District, West Palm Beach, Florida, USA.

Slack, L. J., and D. A. Goolsby. 1976. Nitrogen loads and concentrations in Florida streams. (Map). U.S. Department of the Interior, Gelogical Survey.

Slack, L. J., and M. I. Kaufman. 1973. Specific conductance of water in Florida streams and canals. (Map). U.S. Department of the Interior, Gelogical Survey.

Smith, D. B., J. W. Wakefield, H. A. Bevis, and E. B. Phelps. 1954. Stream sanitation in Florida. University of Florida, Gainesville, Florida, USA.

Reference ID: 259

Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Osceola County/Highlands County/Polk County/Glades County/Orange County/Okeechobee County/Lake Kissimmee/Lake Tohopekaliga/Lake Cypress/Kissimmee River/Taylor Creek/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

This study was undertaken to assemble the existing data relating to stream sanitation in Florida waters.

Study Conclusions

Above Lake Hatchineha, in Polk County, there is no significant pollution of the Kissimmee itself from human sources. Lake Tohopekaliga, in Osceola County receives, at its northern end, septic tank effluent from some 3500 of Kissimmee's 4310 population. The resulting pollution extends to the south about half way through the Lake, but appears to have cleaned up before the water reaches Lake Cypress. There appears to be little pollution of the several small streams draining to the Kissimmee River from the adjacent watershed. There mat be considerable industrial pollution in the waters of the region from the many citrus canneries. The rather large plankton content of the Kissimmee River indicates considerable organic pollution.

Additional Comments

No raw data, no general data, just some conclusions based upon number of people/number of people sewered. Also some BOD's.

Smith, D. H., and R. M. Smart. 2004. Influence of water level on torpedograss establishment in Lake Okeechobee, Florida. Lake and Reservoir Management 20:1-13.

Reference ID: 550

Keywords: Lake Okeechobee/Vegetation/Water depth/Torpedograss

Abstract: Lake Okeechobee, a 173,200 ha shallow subtropical lake located in south Florida, has been invaded recently by torpedograss (Panicum repens), an exotic, terrestrial species, that was intentionally introduced to Florida in the early 1900s. Since the 1970s, more than 6,000 ha of native plants, including spikerush (Eleocharis cellulosa) and beakrush (Rhynchospora spp.) and open water habitat have been displaced by torpedograss in areas of the marsh where inundation depths often are less than 50 cm. The ability of torpedograss to disperse and become established at different water depths was evaluated in a series of experimental pond studies. These studies revealed that fragments remain buoyant for extended periods and so facilitate the dispersal of torpedograss within the lake. If fragments become anchored to sediment that is either exposed or in shallow water, they can readily root and establish mature plants; Once established, torpedograss can thrive in depths of 75 cm or less and can survive prolonged exposure to flooding depths greater than I m. In this manner, low water periods can contribute to the dispersal and colonization pattern of torpedograss in the lake. When coupled with lake elevation data, these findings suggest that low water levels or drawdowns would increase the marsh area susceptible to torpedograss invasion.

Sompongse, D. 1978. A study of the nitrogen cycle in Lake Conway, Florida, USA. M.S. dissertation. University of Florida, College of Engineering, Gainesville, Florida, USA.

Reference ID: 260
Keywords: Nitrogen/Nitrogen cycle/Nutrients/Lake Conway/Brad Jones/KCOL
Notes: Brent Anderson

Sompongse, D., and D. A. Graetz. 1982. Nutrient availability from decaying vegetation in wetland ecosystems. Pages 243-254 in P. M. McCaffrey, T. Beemer, and S. E. Gatewood, editors. Proceedings of the progress in wetlands utilization and management symposium. Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins, Tallahassee, Florida, USA.
Reference ID: 261
Keywords: LTMP/Kissimmee Basin/ Okeechobee County/Water quality/Nutrients/ KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
Objectives of this study were to evaluate the effect of soil characteristics and aeration on the rate of plant decomposition and on the extent of nutrient release to the underlying water.

Study Conclusions
pH of aquatic system appeared to have the most effect on plant decomposition rates. Lower pH, lower % of organic matter lost in soil. Growth controlled by pH explains this study, decomposition was limited to N and thus only a small amount of N was lost from the decaying organisms. As N released from plant material, it was recycled to organic N. P was not limiting, significant amounts were released from the decaying plant material. In most cases, there was a decrease in nutrient concentration in the overlying water with time as the nutrients were incorporated into the microbial biomass or were absorbed by soils. This suggests that the nutrient loses from wetland ecosystem would be affected by the residence time. If decomposition occurred during short residence time, more of the soluble plant nutrients would be flushed from the system. Aeration did not have a measurable affect on ratios of plant decomposition. This research suggests that nutrients release to overlying waters cannot be predicted by the extent of vegetation decomposition alone and that interactions between the released nutrients and soils con have a significant effect on the regulation of nutrients.

Additional Comments
Data includes compositions of some soil types, plant materials, pH of overlying water, NH_4, TKN, PO_4, TP, Ca, K.

South Florida Water Management District. 1999. Analysis of projected impacts of the Alligator Chain drawdown project on the surrounding water table aquifer. South Florida Water Management District, West Palm Beach, Florida,USA.
Reference ID: 476
Keywords: KCOL/Chris Carlson
Notes: Recorded by Brent Anderson 4/24/2005

____. 1982. Kissimmee chain of lakes limnetic and material budget study program. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 263
Keywords: LTMP/Kissimmee Basin/East Lake Tohopekaliga/Fells Cove/Lake Tohopekaliga/Boggy Creek/Jim Branch/Partin Canal/Shingle Creek/Southport Canal/C-35/St. Cloud Canal/C-31/Southport Canal/C-35/Mills Slough/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
This is a basic study of Lake Tohopekaliga, East Lake Tohopekaliga, Cypress, Hatchineha, and Kissimmee emphasizing the sources and consequences of nutrient enrichment. General purpose is to begin establishing a limnetic and tributary water chemistry database for the major lakes, specifically collected in conjunction with hydrologic data to: (1) identify special variations and temporal trends in lake quality (2) relate inflow quality to lake quality and land use (3) investigate upstream lakes affects upon downstream lakes (4) calculate nutrient budget for each lake (5) prioritize management strategies (6) assess trophic state (7)

compute maximum allowable nutrient loads.

Study Conclusions

P is highest in west city ditches. Rainfall and groundwater P levels for east and west Tohopekaliga are generally less than the tributary inflows. OPO_4 predominant P. Rainfall N less than most tributaries, however, inorganic N levels usually exceeded tributary levels. Groundwater N levels high in N areas of east and west Tohopekaliga and could be a sign factor if inflows are high. Chloride usually low. Daytime DO in lakes high (7-10 mg/l). East Tohopekaliga slightly acidic (5.4-7.8) and soft (<0.10 mg/L) Lake Tohopekaliga has slightly basic pH (7.3-8.6) and has highest in south end, and is also harder (alk= 0.99mg/L). Fells Cove has higher turbidity and color than the rest for East Lake Tohopekaliga. Lake Tohopekaliga is 3.5 times greater than East Lake Tohopekaliga and decrease from north to south Lake Tohopekaliga. East Lake Tohopekaliga P values low but high in Lake Tohopekaliga, especially in north end. Inorganic N and Total N in East Lake Tohopekaliga were low and in south end of Lake Tohopekaliga. Total N increased from north to south in Lake Tohopekaliga.

Additional Comments

Data based upon very limited number of data points and is considered preliminary and subject to revision.

____. 2002. Lake Tohopekaliga extreme drawdown and habitat enhancement project, Osceola County, Florida. U. S. Army Corps of Engineers & South Florida Water Mangement District, Jacksonville, Florida, USA & West Palm Beach, Florida, USA.

Reference ID: 553

Keywords: Lake Tohopekaliga/Muck/Vegetation

Abstract: PURPOSE: The temporary lowering of water levels in Lake Tohopekaligato and Lakes Cypress, Hatchineha, and Kissimmee in Oceola County, Florida is proposed to allow lake levels to be lowered for the purpose of monitoring habitat for fish and wildlife species. Lake Tohopekaliga, the central focus of the plan, is a 18,810 body of water located in the Upper Kissimmee Chain of Lakes. The average depth of the lake during normal water level conditions is six feet and the drainage basin encompasses 620 miles, which includes the cities of Orlando, Kissimmee, and St. Cloud. Primary uses of the lake include recreation and flood control. The Lake Tohopekaliga suffers from degraded fish and wildlife habitat due to long-term stabilization of water levels, excessive nutrient inputs, overgrowth and decomposition of vegetation, and build-up of aquatic macrophytes and macroalgae. The resulting accumulation of organic sediments can be consolidated by dense growth of aquatic plants that aid in the formation of organic berms around the shorelines. Formation of tussocks also occurs as a result of changes in aquatic plant communities and the buildup of organic sediments, which can break loose during water level changes and storm events. Biological productivity of the lake's diverse fishery decreases as organic sediment depths increase. Twelve alternatives were originally considered, but all but three of these have been eliminated. In addition to the No Action Alternative (Alternative 10), two action alternatives are considered in detail in this draft EIS. The preferred alternative (Alternative 4w) would involve implementing a plan allowing for gravity flow to the lower lakes and flexible refill of the lakes. Organic material and associated vegetation would be removed from the along the shoreline/littoral zone of Lake Tohopekaliga. A permit has been issued to provide for removal of 4.0 million cubic yards of aquatic vegetation and organic material from 2,844 acres of the lake bottom along it's 39.8-mile shoreline. The material would be removed using heavy equipment such as bulldozers, front-end loaders, trackhoes, graders, and four- to six-wheel-drive dump trucks. The material would be placed in 48 island disposal sites

covering up to 141 acres and 29 upland disposal sites. Estimated cost of the project range between $6.0 million and $10.8 million. POSITIVE IMPACTS: The plan would reduce muck and nuisance vegetation, improve habitat for the recreational fishery, improve boat access to and from docks, generally improve recreational use of the lake, and enhance native aquatic plant life. The island disposal sites would create wildlife habitat. NEGATIVE IMPACTS: Access between the lakes would be reduced or eliminated during drawdown due to low water levels. The creation of in-lake disposal islands for disposal of muck removed from the lake would reduce fish habitat create a nuisance. Water released during the drawdown would be lost of natural and human needs in downstream areas. Due to loss of recruitment, macro-invertebrates would require two to three years to recover. Plan implementation activities would cause shor-term turbidity in the water column of the lake and would degrade area aesthetics. Plan activities could affect the habitat of the snail kite, a federally protected species. There would be some degree of risk that the lakes would not refill following drawdown. LEGAL MANDATES: Water Resources Development Act of 1992 (P.L. 102-580).

____. 1981. Water quality management strategy for Lake Okeechobee- exclusive summary. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 262
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Lake Okeechobee/Kissimmee River/Taylor Creek/Nubbins Slough/Water quality/Nutrients/KCOL/ Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
Report summarizes the Districts efforts during past 2 years to develop a water quality management strategy for Lake Okeechobee to reduce N and P inputs.

Additional Comments
No raw data-deals mainly with nutrient loadings, reduction. Various other district structures- S127, S129, S131, S133.

South Florida Water Management District, Division of Chemistry. 1982. Raw data in computer files. Unpublished report on file in West Palm Beach, Florida, USA.

South Florida Water Management District, Division of Environmental Sciences. 1982. Raw data in computer files. Unpublished report on file in West Palm Beach, Florida, USA.

Sprandel, G. L., R. L. Gaileux, and D. T. Cobb. 2002. Influence of a reservoir drawdown on bird use of Lake Talquin, Florida. Lake and Reservoir Management 18:164-176.
Reference ID: 505
Keywords: KCOL/Agustin Valido/Drawdown/Birds/Lake Taquin
Notes: Recorded by Brent Anderson 5/23/2005

Steele, T. D., E. J. Gilroy, and R. O. Hawkinson. 1974. An assessment of areal and temporal variations in streamflow quality using selected data from the national stream quality accounting network. U.S. Department of the Interior, Geological Survey, Reston, Virginia.
Reference ID: 266
Keywords: LTMP/Istokpoga basin/Glades County/Highlands County/C-41/Fisheating Creek/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study

Stream flow chemical quality and temperature data at 88 stations throughout the U.S. were analyzed to develop and evaluate methods for the general assessment of the variation of the Nations stream flow quality spatially and temporally. Purpose was to (1) describe analytical approaches for evaluating areal and temporal stream changes in temperature, NO_3, Cl, TdS, specific conductivity, and hardness (2) to tabulate and discuss results of application of procedures to available station records, nationally, to assess present condition and temporal changes (3) to delineate specific needs for further study.

Study Conclusions

Lowest harmonic amplitudes (indicative of little seasonal variation) in stream temperature were observed for Florida, the eastern Gulf Coast and the Pacific Coast quality temporal trends were noted in Florida waters.

Additional Comments

Spatial variation described by use of sample stats (min, mean, max). Temporal variations described by non parametric stats (mean, amplitude, phase coefficient derived from harmonic analysis). Data set was reviewed for accuracy and any presumed outliers were eliminated from set. Raw data includes the min, max and mean Fisheating Creek (Region 0309, Sequence 11 station 02256500) and C-41A at Lake Istokpoga (Region 0309 sequence 12 station 02273200).

Steinman, A. D., Conklin. J., P. J. Bohlen, and D. G. Uzarski. 2003. Influence of cattle grazing and pasture land use on macroinvertebrate communities in freshwater wetlands. Wetlands 23:877-889.

Reference ID: 547

Keywords: General/Macroinvertebrates/Vegetation/Wetland

Abstract: Responses of wetland abiotic variables and aquatic invertebrate community structure to cattle stocking density, pasture type, and dominant vegetation were evaluated in subtropical pastures. Cattle were stocked at four treatment levels on improved (fertilized) and semi-native (unfertilized) pastures in south-central Florida, USA. Improved pasture wetlands were dominated either by Panicum hemitomon (maidencane) or by a mixture of Polygonum spp. (smartweed) and Juncus effusus; semi-native pasture wetlands were dominated mainly by maidencane. Cattle stocking density had few significant effects on water-column nutrient concentration or invertebrate community structure. However, water-column nutrient concentrations were significantly greater in the wetlands on improved pastures compared to semi-native pastures. Invertebrate richness and diversity were greater in wetlands on semi-native pastures than on improved pastures, despite lower nutrient concentrations in the former. Overall, the cattle stocking treatment had little impact on invertebrate community structure in these systems relative to prior pasture land use. However, vegetation type influenced invertebrate communities and explained some of the differences between pasture types. Semi-native (lower nutrient) wetland pastures dominated by maidencane had significantly greater invertebrate richness and diversity than improved (higher nutrient) wetland pastures dominated by mixed vegetation but showed no difference when compared to improved wetland pastures dominated by maidencane. Chironomids were the dominant invertebrate in wetlands of both pasture types. Correspondence analysis revealed that ostracods and Culicidae larvae might be useful as bioindicators of subtropical wetlands that are experiencing cultural eutrophication.

Stenberg, J. R., D. L. Day, and G. R. Best. 1991. Development of natural vegetation in the Lake Apopka marsh flow-way demonstration project: Phase I, baseline conditions. St. Johns Water Management District.,

Reference ID: 545

Keywords: Lake Apopka/Vegetation/Wetland

Stenberg, J., M. Clark, and R. Conrow. 1997. Development of natural and planted vegetation and wildlife use in the Lake Apopka marsh flow-way demonstration project; 1991-1994. University of Florida, Center for Wetlands, Ganesville, Florida, USA.
Reference ID: 540
Keywords: Lake Apopka/Vegetation/Wetland

Stewart, E. H., L. H. Allen, and D. V. Calvert. 1977. Water quality of streams on the Upper Taylor Creek Watershed, Okeechobee County, Florida. Soil and Crop Science Society of Florida Proceedings 37:117-120.
Reference ID: 482
Keywords: LTMP/Kissimmee River/Okeechobee County/Taylor Creek /Little Bimini Creek/Otter Creek/Water quality /Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
Weekly samples at high flow, biweekly during low flow were collected for NO_3, OPO_4, specific conductivity, and pH. NO_3 ranged from < 0.04-2.1 mg/l, OPO_4 < 0.06 3.3 mg/l. Annual OPO_4 loads 3 times greater than NO_3. Conductivity was 4.8 mmhos/cm due to artesian water runoff. pH ranged 6-8.3.

Study Conclusions
Nitrate and OPO_4 concentrations were highest in Little Bimini and Otter Creek respectively which drain dairy. Annual NO_3 loads from entire upper Taylor Creek watershed were less than 1/3 of OPO_4 loads. pH averaged 7.1 for sites 1,2 and 3-7.4 for sites 4 and 5. Conductivity was higher I areas irrigated with artesian well water than unirrigated drainage areas.

Storch, W. V. 1975. Lake Okeechobee-Kissimmee basin Proposals for Management Actions. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 452
Keywords: Brad Jones/KCOL

____. 1975. Report to the Governing board on regulatory levels for the lakes of the Upper Kissimmee basin. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 453
Keywords: Brad Jones/KCOL

____. 1972. Statement on the Kissimmee basin project presented to the Governor and Cabinet. Central and South Florida Flood Control District, West Palm Beach, Florida, USA.
Reference ID: 451
Keywords: Brad Jones/KCOL

Sutton, D. L., and K. M. Portier. 1995. Growth of diocious hydrilla in sediments from six Florida lakes. Journal of Aquatic Plant Management 33:3-7.
Reference ID: 529
Keywords: East Lake Tohopekaliga/Lake Tohopekaliga/Cypress Lake/Lake Hatchineha/Lake Kissimmee/Hydrilla/Vegetation
Abstract: Dioecious hydrilla (Hydrilla verticillata (L.f.) Royle) was cultured outdoors in tanks in south Florida for four separate 16-week culture periods using sediments collected four different times from two sites each in East Lake Tohopekaliga, Lake Tohopekaliga, Cypress Lake, Lake Hatchineha, Lake Kissimmee and Lake Okeechobee. Differences in growth of hydrilla as determined by dry weight occurred both for between- and within-lake sediment collection times. Total dry weight of hydrilla plants cultured in sediments from Site 2 in Cypress Lake for the first three culture periods produced an average of 73

g, 203 g, and 99 g per culture container and was higher than plants cultured in any of the other sediments. For the fourth culture period, however, dry weights of hydrilla cultured in sediments from both sites in Lake Hatchineha were similar to those cultured in sediments from Site 2 in Cypress Lake. Dry weight of hydrilla cultured in sediments from East Lake Tohopekaliga, Lake Kissimmee, and Site 1 of lake Okeechobee was consistently low for the four culture periods. For example, hydrilla cultured on sediments from Site 1 in Lake Okeechobee produced an average of 4 g, 14 g, 4 g, and 2 g per culture container during the four culture periods. Subterranean turions (tubers) were produced during two of the culture periods. The highest number of tubers, equivalent to 1,253 and 1,976 tubers per m super(2), were produced in sediments from Sites 1 and 2 of Cypress Lake, respectively, during December 5, 1988 to March 27, 1989. Individual tuber weights averaged 50 mg each and were similar for all sites in all lakes for both culture periods. The ratio of root:shoot dry weight was less than 1 for hydrilla plants cultured on sediments from the six lakes for all four culture periods except for Site 1 in East Lake Tohopehaliga and Sites 1 and 2 in Lake Kissimmee during the July 6 to October 26, 1987 culture period. High dry weight values were related to low root:shoot ratios and low hydrilla weights to high ratios. These data suggest that substantially different amounts of hydrilla growth can be expected to occur both within a among in these six Florida lakes.

Svingen, D., and S. H. Anderson. 1998. Waterfowl management on grass-sage stock ponds. Wetlands 18:84-89.
Reference ID: 322
Keywords: Waterfowl/Macroinvertebrates/Breeding ducks/Broods/Birds/Gary Williams/KCOL

Swift, D. R. 1985. Phytoplankton dynamics in Upper Kissimmee Chain of Lakes. Quarterly Journal of the Florida Academy of Sciences 48:37.
Reference ID: 528
Keywords: KCOL/Phytoplankton

Takamura, N., Y. Kadono, M. Fukushima, and M. Nakagawa. 2003. Effects of aquatic macrophytes on water quality and phytoplankton communities in shallow lakes. Ecological Restoration 18:381-395.
Reference ID: 632
Keywords: Vegetation/SB/Distribution/Japan/Brad Jones/Eutrophication/Ceratophyllum/Phosphorus/Nitrogen /Nutrients/Chlorophyll a/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Taylor, B. R. 1975. Investigations of potential Kissimmee River marsh water quality benefits. Florida Coastal Engineers, Inc., Jacksonville, Florida, USA.
Reference ID: 267
Keywords: Water quality/Kissimmee River/ Wetlands/Marsh/Brad Jones/KCOL
Notes: Brent Anderson

Terrell, J. B., D. L. Watson, M. V. Hoyer, M. S. Allen, and D. E. Canfield, Jr. 2000. Temporal water chemistry trends (1967-1997) for a sample (127) of Florida waterbodies. Lake and Reservoir Management 16:177-194.
Reference ID: 569
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Terrell, T. B., and D. E. Canfield, Jr. 1996. Evaluation of the effects of nutrient removal and the "Storm of the Century" on submersed vegetation in Kings Bay - Crystal River, Florida. Lake and Reservoir Management

12:394-403.
Reference ID: 585
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 5/31/2005

Titus, J. E. 1993. Submersed macrophyte vegetation and distribution within lakes: line transect sampling. Journal of Lake and Reservoir Management 7:155-164.
Reference ID: 629
Keywords: Vegetation/SB/Sampling method/Species composition/Water depth/Heterogeneity/Primary production/Coontail/Certophyllum
Notes: Recorded by Brent Anderson 6/02/2005

Toth, L. A., D. A. Arrington, and G. Begue. 1997. Headwater restoration and reestablishment of natural flow regimes: Kissimmee River of Florida. Pages 425-442 in J. E. Williams, C. A. Wood, and M. P. Dombeck, editors. Watershed restoration: principles and practices. American Fisheries Society, Bethesda, Maryland, USA.
Reference ID: 454
Keywords: Brad Jones/KCOL

Toth, L. A., J. W. Koebel, Jr., A. G. Warne, and J. Chamberlain. 2002. Implications of reestablishing prolonged flood pulse characteristics of the Kissimmee River and floodplain ecosystem. Pages 191-221 in B. Middleton, editor. Flood Pulsing in Wetlands: Restoring the Hydrologic Balance. John Wiley & Sons, New York, New York, USA.
Reference ID: 457
Keywords: Brad Jones/KCOL

Toth, L. A., S. L. Melvin, D. A. Arrington, and J. Chamberlain. 1998. Managed hydrologic manipulations of the channelized Kissimmee River, Florida (USA): implications for restoration. BioScience 48:757-764.
Reference ID: 455
Keywords: Brad Jones/KCOL

Toth, L. A., J. Obeysekera, W. A. Perkins, and M. K. Loftin. 1993. Flow regulation and restoration of Florida's Kissimmee River. Regulated Rivers: Research & Management 8:155-166.
Reference ID: 456
Keywords: Brad Jones/KCOL

Trebitz, A. S., and N. Nibbelink. 1996. Effects of pattern of vegetation removal on growth of bluegill: a simple model. Canadian Journal of Fisheries and Aquatic Sciences 53:1844-1851.
Reference ID: 506
Keywords: KCOL/Agustin Valido/Bluegill/Vegetation/Fish
Notes: Recorded by Brent Anderson 5/23/2005

Tugend, K. 2001. Effects of a habitat enhancement on littoral plant and fish communities. Proceedings of the 131st American Fisheries Society Annual Meeting. American Fisheries Society, Bethesda, Maryland, USA.
Reference ID: 537
Keywords: Vegetation/Location unknown

Tugend, K., and M. Allen. 2001. Habitat structure in lakes and reservoirs. LakeLine 21:23-25.
Reference ID: 538
Keywords: General/Fish/Vegetation/Hydrology
Abstract: Lakes and reservoirs occasionally experience declines in the quality and amount of fish habitat. In this article, we define habitat for fish as (1) shelter and cover for adult fish, (2) refuge and protection for juvenile fish, and (3) structure for spawning or nesting

activities. Habitat loss in lakes typically includes reductions in aquatic plants and shoreline vegetation or increases in siltation and organic deposits. Such habitat changes in lakes may result from natural or anthropogenic eutrophication, shoreline development, or changes in the hydrology of a system due to flood-control efforts. Most reservoirs in the United States were built prior to the 1970s. Through time, woody debris present in young reservoirs deteriorates, resulting in the loss of habitat in older reservoirs. Due to high rates of sedimentation in reservoirs, the amount of firm substrates also declines. Firm substrates are perceived as important fish spawning habitat.

Tugend, K. I. 2001. Changes in the plant and fish communities in enhanced littoral areas of Lake Kissimmee, Florida, following a major habitat enhancement. M.S. dissertation. University of Florida, Gainesville, Florida, USA.
Reference ID: 372
Keywords: KCOL/Lawrence Glenn/Fish/Lake Kissimmee
Notes: Recorded by Brent Anderson 4/4/2005

Tugend, K. I., and M. S. Allen. 2004. Changes in the plant and fish communities in enhanced littoral areas of Lake Kissimmee, Florida, following a habitat enhancement. Lake and Reservoir Management 20:54-64.
Reference ID: 369
Keywords: KCOL/Lawrence Glenn/Fish/Lake Kissimmee
Notes: Recorded bt Brent Anderson 4/4/2005

Tugend, K. I., M. S. Allen, and M. W. Binford. Date unknown. Use of geographic information systems and remote sensing to identify factors related ot plant re-establishment in enhanced areas of Lake Kissimmee, Florida, USA. Unpublished report on file in Gainesville, Florida, USA.

Turner, R. L. 1996. Use of stems of emergent plants for oviposition by the Florida applesnail, *Pomacea paludosa,* and implications for marsh management. Florida Scientist 59:34-49.
Reference ID: 334
Keywords: Macroinvertebrates/Joe Koebel/KCOL
Notes: Recorded by Brent Anderson 3/22/2005

How are the data in this document applicable to the metrics we are evaluating?

Study examines the distribution among emergent plant stems of egg clutches deposited by the Florida applesnail in four types of marsh. May have implications for managing lake levels to provide optimum habitat for the Florida applesnail.

What parameters were monitored?

Stem density, % of narrow stems, clutch density, mapped area, mapped perimeter, clutch standing crop, clutch size, % of occupied stems, water depth, and clutch elevation

What was the geographic extent of monitoring?

Blue Cypress Water Management Area at the intersection of SR 512 and SR 60

How many samples or sample locations were monitored?

Four transects (1 per habitat type) ranging from 25 to 100 meters in length, were sampled 6 or 7 times. Replicate quadrats (3-10) were sampled on each date.

What was the sampling frequency and duration (period of record)?

Samples were collected July-August 1992 and June through September 1993.

Do these data cover the baseline or reference (pre-1960s) period?

Baseline period

Who collected the data?

Collected by the author under contract with the St. John's River Water Management District.

Where are the data located? (agency or organization maintaining database)

Raw data are held by SJRWMD. Data have been published in Florida Scientist 59:34-49.

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)

Unknown

Are raw data and/or summarized data presented in the document?

Yes.

Is a summary of findings presented in the document?

Yes.

Comments: Study indicates that clutch density was highest along the edge of sawgrass marsh and zero in deep marsh. Clutches occurred preferentially on plants having broad stems (e.g., sawgrass, *Pontederia*, and *Sagittaria*). Data indicate that marshes (I assume this can include lake littoral zone marshes) should be managed for a heterogeneous community of broad-stemmed emergent aquatic plants at moderate density.

J.W. Koebel Jr. 2/21/2005

U.S. Army Corps of Engineers. 1991. Central and southern Florida. Final feasibility report and environmental impact statement: Environmental restoration of the Kissimmee River, Florida. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 461
Keywords: Brad Jones/KCOL

____. 1956. Central and Southern Florida, Kissimmee River basin and related areas. Supplement 5- General Design Memorandum, Kissimmee River Basin. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 459
Keywords: Brad Jones/KCOL

____. 1985. Central and southern Florida, Kissimmee River, Florida. Final feasibility report and environmental impact statement. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 460
Keywords: Brad Jones/KCOL

____. 1971. Environmental Impact Statement, Central and Southern Florida project, Draft. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 271
Keywords: LTMP/Kissimmee Basin/Istokpoga Basin/Osceola County/Orange County/Polk County/Okeechobee

County/Glades County/Highlands County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/4/2005

Brief Description of Study
Environmental statement including the Kissimmee River Basin.

Study Conclusions
Lake Tohopekaliga receives effluent from city of Kissimmee sewage treatment plant. Influence evident south to about mid-lake. There are mo other significant pollution sources form humans above Lake Hatchineha. Water quality influenced by several small streams draining well cultivated areas in the heart of the citrus belt. High plankton content of the Kissimmee River indicates considerable organic pollution from the citrus canneries and packing plants in the area. C-38 permits water to be delivered to Lake Okeechobee with very little change in quality. Taylor Creek receives sewage discharge from town and correctional institute. Dairy operations and sewage discharge coupled with zero flow during dry season compound problems and accelerate eutrophication of creek. Nubbins Slough also has considerable pollution load caused by route through pasture lands.

Additional Comments
Good development as to location and influence between streams and lakes within both basins. How lakes are fed and where water goes.

____. 1973. Environmental Impact Statement, Central and Southern Florida Project, Lake Okeechobee. Draft-Final. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 273
Keywords: Kissimmee Basin/Istokpoga Basin/ Osceola County/Orange County/Polk County/Okeechobee County/Glades County/Highlands County/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/4/2005

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Additional Comments
Good development as to location and influence between streams and lakes within both basins. How lakes are fed and where water goes.

____. 1972. Environmental Impact Statement, Lake Okeechobee, Draft. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 272
Keywords: Environmental/Lake Okeechobee/ Brad Jones/KCOL
Notes: Brent Anderson

____. 1973. Final Environmental Impact Statement, Central and Southern Florida Project, Lake Okeechobee. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 274
Keywords: Kissimmee Basin/Istokpoga Basin/ Okeechobee County/Glades County/Fisheating Creek/Harney

Pond/C-41/Indian Prairie Canal/C-40/Kissimmee River/Taylor Creek/Nubbins Slough/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/4/2005

Brief Description of Study
Environmental statement.

Study Conclusions
During periods of high flow, Fisheating Creek exhibits an O_2 gas as a result of oxidation of organics flushed to stream from adjacent areas. In general, it exhibits high color, low mineral content with dissolved solids ranging from 50 to 120 mg/l. Average N load is 1.4 mg/l which represents 2 tons/day to Lake Okeechobee average P input is 0.068 mg/l or 0.1 tons/day. Harney Pond N and P concentrations are 1.2 mg/l (0.92 tons/day) and 0.072 mg/l (0.055 tons/day) respectively. Indian Prairie Canal contains high nitrate and NH_4. This indicates organic pollution generally the type associated with swamp waters. Average N and P concentrations respectively are 1.6 mg/l (0.42 tons/day) and 0.084 mg/l (0.023 tons/day). Kissimmee River and Taylor Creek are major P contributors. Otherwise chemical quality is excellent in Kissimmee River. Dissolved solids average 108 mg/l. D.O. ranges 4.6-10.1 mg/l. Average N and P concentrations, respectively, are 0.99 mg/l (9.06 tons/day) and 0.078 mg/l (0.72 tons/day). This represents lowest N and highest P loads contributed to lake. Taylor Creek is highly colored and exhibits high dissolved solids, Na, SO_4, Cl concentrations. High dissolved solids (average 249 mg/l) are believed to be contributed by Williamson Ditch. Average N and P concentrations are 1.6 mg/l (1.38 tons/day) and 0.62 mg/l (0.53 tons/day) respectively. D.O. in Nubbins Slough between 1.0 and 9.4 mg/l. Average N and P concentrations are 1.6 mg/l (1.38 tons/day) and 0.62 mg/l (0.53 tons/day) respectively. D.O. in Nubbins Slough are between 1.0 and 9.4 mg/l. Average N and P concentrations to lake are 2.0 mg/l (0.27 tons/day) and 0.36 mg/l (0.049 tons/day) respectively. Data indicates a water budget with dissolved S, N and P.
Additional Comments
No raw data, only conclusions.

____. 2003. Hydrogeologic conceptualization of the Kissimmee River Chain of Lakes Region. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Jacksonville, Florida, USA.

Reference ID: 486

Keywords: LTMP/Water quality/Nutrients/KCOL/Brad Jones/Chris Carlson

Notes: Recorded by Brent Anderson 4/28/2005

Brief Description of Study
The US Army Corps of Engineers is developing and Environmental Impact Statement to evaluate the regulation schedules and proposes alternatives for environmental benefit. Part of this analysis includes the development of a regional groundwater model of the KCOL system meant to investigate the impacts of the proposed alternatives on subsurface flows and water levels. This report contains the following: (1) An initial review to develop a conceptualization of the groundwater flow regime (2) a literature review with compiled data (3) review of existing models (4) recommendations for a modeling approach were made.

____. 1979. Kissimmee River, Florida. Reconnaisance Report (Stage 1). U.S. Army Corps of Engineers, Jacksonville, Florida, USA.

Reference ID: 276

Keywords: Kissimmee Basin/Kissimmee River/ Taylor Creek/Skeeter Creek/St Cloud Canal/C-31/Nubbins Slough/East Lake Tohopekaliga/Lake Tohopekaliga/Lake Kissimmee/Lake Cypress/Lake Hatchineha/Lake Gentry/Lake Ajay/ Alligator Lake/Center Lake/Coon Lake/Trout lake/Lake Lizzie/Brick Lake/Joel Lake/Murtle Lake/Preston Lake/Hart Lake/lake Mary Jane/Oak Creek/Chandler Slough /Yates Marsh/Okeechobee County/Orange County/Osceola County/Highlands County/Polk County/Glades County/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/4/2005

Brief Description of Study
Purpose was to evaluate feasibility of modifying the existing flood control central system for purposes of improving water quality and enhancing fish and wildlife resources. Scope includes identifying all pertinent

water resource management problems and needs; formulating potential solutions, projection of economic, environmental, and social inputs of alternatives; and analyzing merits of various plans to select one which best fulfills the equal national objective.

Study Conclusions

Additional Comments
Report covers all resources within the entire projects from Orlando South to Lake Okeechobee. Report contains a good history of area and project, groundwater and general geology, lake stages. Contains a list of prior studies.

____. 2002. Scope of Work Kissimmee Chain of Lakes Integrated Feasibility Study. U.S. Army Corps of Engineers, Planning Division, Jacksonville, Florida, USA.
Reference ID: 507
Keywords: KCOL/Agustin Valido
Notes: Recorded by Brent Anderson 5/23/2005

____. 1975. Survey Report on Lake Istokpoga Area, Florida, USA. U.S. Army Corps of Engineers, Jacksonville, Florida, USA.
Reference ID: 275
Keywords: Istokpoga Basin/Highlands County/C-41A/Lake Istokpoga/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/4/2005

Brief Description of Study
Purpose of this report is to present the results of studies made to determine the feasibility of modifying the authorized C & SFC- Project, Florida, to improve flood protection and control of water levels of Lake Istokpoga, Highlands County.

Study Conclusions
The shallow depths of the lake make it sensitive to air temperatures. The quality was determined by the USGS at an observation station in C-41A above S-68 and in the lake proper by the Game and Fish Commission under the Dingell Johnson Project F-21-4 Federal Aid in Fish Restoration in 1969-70 (published in the annual progress report).
Additional Comments
USGS data ranged from 1963-1968 range of variables. Game and Fish data in 1969 and 1970- probably 2 sampling trips- 1 each year. No conclusions. Some trace metal, major cations and anions, dissolved solids, physical data, chlorophyll a.

U.S. Department of Agriculture, Soil Conservation District. 1973. River basin investigations. Report for Kissimmee-Everglades area. U.S. Department of Agriculture, Soil Conservation District, Gainesville, Florida, USA.
Reference ID: 270
Keywords: River basin/Kissimmee River/Everglades/Brad Jones/KCOL
Notes: Brent Anderson

____. 1968. Taylor Creek watershed completion report. U.S. Department of Agriculture, Soil Conservation District, Gainesville, Florida, USA.
Reference ID: 269
Keywords: Taylor Creek /Brad Jones/KCOL
Notes: Brent Anderson

U.S. Environmental Protection Agency. 1978. A compendium of lake and reservoir data collected by the National Eutrophication Survey in eastern, north-central, and southeastern United States. Working Paper No. 475. Pacific Northwest Environmental Research Laboratory, Corvalis, Oregon, USA.
Reference ID: 286
Keywords: Lakes/Reservoir/Brad Jones/KCOL
Notes: Brent Anderson

____. 1980. Eutrophication analysis of Lake Tohopekaliga, Florida. U.S. Environmental Protection Agency, Atlanta, Georgia, USA.

Reference ID: 287

Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/East Lake Tohopekaliga/Partin Canal/Shingle Creek/St. Cloud Canal/C-31/Wildcat Branch/Water quality/Nutrients/ KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

The purpose of this study is to update the nutrient loading/trophic state analysis of Lake Tohopekaliga.

Study Conclusions

A review of the historical in-lake water quality would indicate that N and P in lake have been increasing as have chl a. The lake is stressed or eutrophic. During some period, effluent from Sand Lake Road and McCloud Road facilities have increased substantially. Increased sewage flow from these facilities has contributed to increased N, P and chl a. Vollenweider model is valid for Lake Tohopekaliga. Lake Tohopekaliga is N limited. Total N:Total P ratio is 5.5:1 in Southern Lake in 1979. Average annual N load is 1,694,418 lbs/yr total P. Dangerous nutrient loads for Lake Tohopekaliga are 141 lbs/day total P and 2,112 lbs/day total N. To improve lake quality, point and non-point sources must be reduced or eliminated. Major components of nutrient control for Lake Tohopekaliga would include reduce non-point and point sources in Shingle Creek. Reduce non-point sources of direct drainage to lake and eliminate remaining point sources.

Additional Comments

Nutrient loading data, flow data, temporal quality for nutrients, chl a, etc. available, sediment nutrient levels for Shingle Creek and pore water, rainfall contribution plus sewage input loads.

____. 1976. Preliminary report on Glenada Lake, Highlands County, Florida. National Eutrophication Survey, PNERL, Corvalis, Oregon, USA; or NERC, Las Vegas, Nevada, USA.

Reference ID: 281

Keywords: Istokpoga Basin/Highlands County/Lake Glenada/Water quality/Nutrients/ KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

Tributaries and nutrient sources were not sampled. Report is only lake data

Study Conclusions

Glenada Lake is eutrophic. Assays link N to limiting nutrient at all stations and all times

Additional Comments

Range, mean, median of range of select variables, limiting nutrient data, rankings, raw data.

____. 1975. Preliminary report on Lake Istokpoga, Highlands County, Florida. National Eutrophication Survey, PNERL, Corvalis, Oregon, USA; or NERC, Las Vegas, Nevada, USA.

Reference ID: 278

Keywords: Istokpoga Basin/Highlands County/Lake Istokpoga/Arbuckle Creek/Josephine Creek/Istokpoga Canal/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Study Conclusions

Lake Istokpoga is eutrophic. Lake data indicate a temporal and spatial combination of limiting nutrients. City of Sebring is the largest contributor to total load. More than 92% of the mean annual phosphorus load contributed by non-point sources. Arbuckle Creek is the largest P contributor (59%) draining agriculture lands.

Additional Comments

Contains range mean and median data for range of variables. Limiting nutrient data, nutrient loads. Lake rankings are presented, Tributary flow data and raw data.

U.S. Environmental Protection Agency. 1975. Preliminary report on Lake Marion, Polk County, Florida. National Eutrophication Survey, PNERL, Corvalis, Oregon, USA; or NERC, Las Vegas, Nevada, USA.

Reference ID: 277

Keywords: Kissimmee Basin/Polk County/Lake Marion Creek/Lake Marion/Indian Head Swamp/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Study Conclusions

Lake Marion is eutrophic. High phytoplankton counts and chl a (27-41 mg/l). Phosphorus limited. High inorganic N to Ortho-P ratio. Only point sources impacting lake were septic tanks along shoreline which contributed 1.1% of total P load. Prior to 71-72 the lake received effluent from activated sludge plant serving Haines City. Existing trophic state is probably due to higher loading rate prior to 1971. Non-point source contribute 98.9% of total P input to the lake. The largest contributor from immediate watershed and minor tributaries account for 61.9% of P. Land use is primarily agriculture.

Additional Comments

Range, mean, median of data, limiting nutrient data, loads, rankings, raw data, tributary data, wastewater data.

U.S. Environmental Protection Agency. 1975. Preliminary report on Lake Weohyakapka, Polk County, Florida. National Eutrophication Survey, PNERL, Corvalis, Oregon, USA; or NERC, Las Vegas, Nevada, USA.

Reference ID: 279

Keywords: Kissimmee Basin/Polk County/Lake Weohyakapka/Tiger Creek /Weohyakopka Creek/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Study Conclusions

Lake is mesoeutrophic. Estimated P contribution from point sources amounted to 10.8% of total. Indian Lakes Estates contributed most of that (9.5% of total), the remainder is septic tanks along the shoreline. Nutrient contribution from groundwater- unknown. Estimated loads from non-point sources is 89%. Tiger Creek contributed over 33% of total P load. Precipitation accounts for 37%. Land use predominantly agriculture. Non-point sources of nutrients are lower than expected, nutrient source could be significant groundwater input.

Additional Comments

Weohyakopka Creek (inflow) range, mean, median of select variables, nutrient algal assays, loads, lake rankings, tributary flow data, raw and wastewater data.

____. 1975. Preliminary report on Reedy Lake, Polk County, Florida. National Eutrophication Survey, PNERL, Corvalis, Oregon, USA; or NERC, Las Vegas, Nevada, USA.

Reference ID: 280

Keywords: Istokpoga Basin/Polk County/Reedy Lake/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Study Conclusions

Reedy Lake is eutrophic. Depressed D.O's in marsh, high phytoplankton counts. Algal assay results with P as limiting nutrient. Inorganic N to Ortho-P ratio of 14 to 1 or greater at all stations and times except station 2 in November. Point sources contributed only 4.5% of total P to lake. Ben Hill Griffin Citrus Processing Plant and Lakeshore dwellings septic tanks collectively (estimated) contributed a majority of the P. Non-point sources contribute 95.5% of total P. Largest nutrient source from immediate drainage and minor tributaries (87%)- mainly cities.

Additional Comments
Range, mean, median of range of variables. Limiting nutrient data, nutrient loads. Lake ranking and raw data, tributary flow data.

Key words
Istokpoga Basin/Polk County/Reedy Lake/Water quality/Nutrients/KCOL/Brad Jones

____. 1977. Report on East Lake Tohopekaliga, Osceola County, Florida. National Eutrophication Survey, Corvalis, Oregon, USA.
Reference ID: 282
Keywords: Kissimmee Basin/Osceola County/Fells Cove/East Lake Tohopekaliga/Boggy Creek/St. Cloud Canal/C-31/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
Annual total P and total N loads to lake were estimated and subdivided by point and non-point source. An assessment of Lakes trophic condition and limiting nutrients provided.

Study Conclusions
East Lake Tohopekaliga is mesotrophic. East Lake Tohopekaliga is phosphorus limited at time of sampling. Point sources include septic tanks, point sources contributed ~ 14% of total P and 25% of total N to East Lake Tohopekaliga. The sampling year was 0.72 g/m^2 or 1.8 x greater than that proposed. After survey though AFB personnel was sharply reduced. However, data indicate that complete removal of point source would still leave load 40.62g/m^2/yr or ~ 1.6 x. Estimated contribution of non-point source accounted for 86% for total P and 97.5% of total N inputs to lake. Boggy Creek contributed 33.5% of the P load and 16.4% of the N load and estimated minor tributaries and immediate drainage accounted for 45.2% of P and 71.4% of N inputs. According to Orange County DPC as cited by Federico and Brezenik, 1975, dairy farms and cattle ranches are major contributors of nutrients to Boggy Creek. Report gives Lake map, drainage area, and flows of inflows and outflows. Phytoplankton and chl samples were taken. N/P ratios Report contains lake rankings, tributary flow data, raw data, tributary and wastewater treatment plant data, loads.

Additional Comments
3 samples collected in East Lake Tohopekaliga. One in Fells Cove- 4 samples collected in Lake Tohopekaliga.

____. 1977. Report on Lake Istokpoga, Highlands County, Florida. U.S. Environmental Protection Agency, Corvalis, Oregon, USA.
Reference ID: 462
Keywords: Brad Jones/KCOL

____. 1977. Report on Lake Kissimmee, Osceola County, Florida. National Eutrophication Survey, Corvalis, Oregon, USA and Las Vegas Nevada, USA.
Reference ID: 283
Keywords: Kissimmee Basin/Osceola County/Lake Kissimmee/Kissimmee River/Tiger Creek/Jackson Canal/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
The NES was initiated in 1972 in response to an administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs. Was designed to develop, in

conjunction with state environmental agencies, information on nutrient sources, concentrations and impact on selected fresh water lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and non-point source pollution abatement in the lake watershed.

Study Conclusions

Lake Kissimmee is eutrophic. PO_4 limitation in March and September. Nitrogen in November. No known point sources directly impact Lake Kissimmee during the year. Direct and indirect point sources contribute nutrients to Reedy Creek and upstream Lake Tohopekaliga and Lake Weohyakapka, unknown impact due to nutrient retention in receiving lakes and probable sedimentation and a biological assimilation in intervening water bodies. Nutrient export rates and N/P ratios of connecting streams accounted for essentially all the PO_4 load to Lake Kissimmee. Kissimmee River including the unknown but presumably insignificant contributions of the distant point sources accounted for almost 70% of total. Kissimmee River drains predominantly as land. Significant reduction of nutrient inputs would involve control of nutrient losses from cropland in basin. Reedy Creek and Short Canal were not sampled, however data indicated minimal amounts of P from these sources.

____. 1977. Report on Lake Okeechobee, Glades, Hendry, Martin, Okeechobee, and Palm Beach Counties, Florida. National Eutrophication Survey, Corvalis, Oregon, USA.

Reference ID: 284

Keywords: Kissimmee Basin/Istokpoga Basin/ Okeechobee County/Glades County/Lemkin Creek/Indian Prairie Canal/Harney Pond/Taylor Creek/Kissimmee River/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

This survey was designed to develop information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to non-point source pollution abatement in lake watersheds and point-source discharge reduction.

Study Conclusions

The Kissimmee River had the largest load of any sampled tributaries. However, this river basin is impacted by point sources in its northern reaches (Shingle Creek) and effects of the point sources are reflected in high pollution loads. Other tributaries were estimated to have contributed. Taylor Creek *11%), Harney Pond (7.5%), unnamed Creek B-1 (5.8%), Indian Prairie (2.1%), Lemkin Creek (1.6%), unnamed canal L-1 (1%). Most of loads were non-point including dairy (Taylor Creek) and cattle grazing. Also included significant amounts of nutrients are contributed by cane, vegetation farming. Nubbins Slough, North New River and Hillsboro Canals estimated to contribute over 28% of total P loads to lake.

Additional Comments

Total P and Total N loads and mean nutrient concentrations and raw data.

____. 1977. Report on Lake Tohopekaliga, Osceola County, Florida. National Eutrophication Survey, Las Vegas, Nevada, USA.

Reference ID: 285

Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/Southport Canal/C-35/St. Cloud Canal/C-31/Shingle Creek/Partin Canal/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

NES was initiated in 1972 in response to an administration commitment to the nationwide threat of accelerated eutrophication of freshwater lakes and reservoirs. Designed to develop information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional and state management practices relating to non-point source pollution abatement and point source discharge reduction in lake watersheds. Create model, apply data, assess potential eutrophication control.

Study Conclusions

(1) Lake Tohopekaliga is eutrophic. It ranked 28th in overall trophic quality when 41 Florida water bodies sampled in 1973 were compared using 6 parameters. 27 lakes < median total P, 28 lakes < dissolved P, 24 lakes < median inorganic N. 21 lakes < mean Chl a, 25 lakes > secchi, Lake water is humic-colored, observed algae in March (2) Algal assay indicates that the lake was nitrogen limited during the study. (3) Calculated point sources contribute 52% of total P and 51% of total N. Non-point sources contribute remainder. Tributaries contributed 33.3% of P and 36.5 % of N. Dairy wastes, pasture runoff and urban drainage contribute nutrients to lake.

Additional Comments

Total P, inorganic N, secchi disc, chl a, D.O., and dissolved Ortho-P were studied. City of Orlando McLead Plant and Orange County Plant collectively contribute ~30% of total P and ~33% of total N. Shingle Creek receives effluent but may be a nutrient sink. Excessive loads may reach Lake Tohopekaliga. The degree of phosphorus reduction attainable by municipal point source control would not likely result in a shift to phosphorus limitation, however nitrogen control might reduce the rate of eutrophication. A more intensive study of point source nitrogen control is needed.

____. 1981. Shingle Creek/ Lake Tohopekaliga, Florida, USA- Review of water quality analysis. Draft (with attachments). U.S. Environmental Protection Agency, Washington, D.C., USA.

Reference ID: 288

Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/Water quality/Nutrients/ KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

Report provides an evaluation of the adequacy of the Lake Tohopekaliga water quality analysis. Also provides guidance on the environmental and economic criteria used in advanced treatment reviews so that these criteria are reflected in the on-going water quality analysis and facilities planning activities for the Lake Tohopekaliga basin.

Additional Comments

No raw data. Information here was updated and presented in the final summary- later. Report discusses BMP's models, resuspension of bottom sediments, zero discharge, limiting nutrients, and loads. Good summary of need for future studies.

____. 1981. Technical evaluation of water quality analysis for Lake Tohopekaliga, Florida, USA. (with attachments). U.S. Environmental Protection Agency, Washington, D.C., USA.

Reference ID: 289

Keywords: Kissimmee Basin/Istokpoga Basin/ Lake Tohopekaliga/Lake Trout/Alligator lake/Glenada Lake/South Lake/Lake Istokpoga/Crescent Lake/Lake Okeechobee/East Lake Tohopekaliga/Reedy Lake/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

This analysis was conducted as a result of the congressional approximations conference Committee's directive that EPA funding for projects providing treatment beyond 2 ş may be provided only if the administrator personally determines that the project will definitely result in significant water quality and public health improvements. This report updates earlier report released by Lake Tohopekaliga Task Force on May 20, 1981.

Study Conclusions

Major conclusions emphasized by cover letter are (1) point source phosphorus controlto 0.2 mg/l is definitely required for significant water quality improvements. (2) point source N and P removal or O discharge is likely to result in some additional improvements in in-lake water quality those achievable with P control alone. (3) O discharge would provide maximum improvements in in-lake water quality.

Additional Comments

This report asks questions which would make interesting suggestions for future studies. Some N and P loading data is available. Predicted in lake N and P concentrations, chl a levels. Report also contains a comparison of in-lake nutrient levels with algal assay results for other lakes.

U.S. Environmental Protection Agency, Advanced Treatment Task Force. 1981. Summary of findings water quality analysis conducted for Lake Tohopekaliga, Florida, USA. U.S. Environmental Protection Agency, Advanced Treatment Task Force, Washington, D.C., USA.

Reference ID: 290

Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/Partin Canal/Shingle Creek/St. Cloud Canal/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study

Report provides final EPA determination of the adequacy of Lake Tohopekaliga water quality analysis, in view of the complexity of water quality problems, and the potentially significant costs for very stringent levels of nutrients removal. Provides guidance on environmental and economic criteria used in advanced treatment reviews. Major issues discussed (1) is Vallenweider analysis adequate for necessary expenditures (2) what will be future limiting nutrient (3) how do seasonal and annual loads affect choice of limiting nutrients (4) what are relative costs of water quality improvements of O discharge and AT?

Study Conclusions

Existing quality indicates lake is becoming increasingly eutrophic, primarily due to discharges by city of Orlando and Orange County to Shingle Creek (chl a). Lake drawdown management no longer feasible.

Additional Comments

Page 8 gives factors affecting the eutrophication process which are difficult to assess. These could be factors for further study. (unknown data source)

U.S. Fish and Wildlife Service. 2002. Biological Opinion to the U.S. Army Corps of Engineers, dated July 3, 2003. U.S. Fish and Wildlife Service, South Florida Field Office, Vero Beach, Florida, USA.

Reference ID: 508

Keywords: KCOL/Agustin Valido/Biological Opinion

Notes: Recorded by Brent Anderson 5/23/2005

U.S. Fish and Wildlife Service. 1959. A detailed report of the fish and wildlife resources in relation to the Corps of Engineers' plan of development, Kissimmee River basin, Florida. Page Appendix A in U.S. Army Corps of Engineers, editor. Central and Southern Florida Project for Flood Control and Other Purposes. U.S. Army Corps of Engineers. Part II, Supplement 5. Kissimmee River Basin and Related Areas.

____. 1987. Habitat management guidlines for the bald eagle in the southeast region. U.S. Fish and Wildlife Service, Place of publication unknown.

Reference ID: 329

Keywords: Eagle/Birds/Gary Williams/KCOL

Notes: How are the data in this document applicable to the metrics we are evaluating?

Data are not presented in this document.

What parameters were monitored?

None.

What was the geographic extent of monitoring?

Not applicable.

How many samples or sample locations were monitored?

Not applicable.

What was the sampling frequency and duration (period of record)?
Not applicable.

Do these data cover the baseline or reference (pre-1960s) period?
Not applicable.

Who collected the data?
Not applicable.

Where are the data located? (agency or organization maintaining database)
Not applicable.

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Not applicable.

Are raw data and/or summarized data presented in the document?
Not applicable.

Is a summary of findings presented in the document?
No. This document summarizes current legal guidelines for the management of habitat of the federally threatened bald eagle in the USFWS Southeast Region, which includes Florida. In particular, it summarizes recommended and required restrictions of activities within primary and secondary zones surrounding nest sites.

____. 1999. South Florida multi-species recovery plan. A species plan... an ecosystem aproach. U.S. Fish and Wildlife Service, Southeast Region, Atlanta Georgia.
Reference ID: 479
Keywords: Chris Carlson/KCOL
Notes: Recorded by Brent Anderson 4/26/2005

U.S. Geological Survey. 1980. Water resources data for Florida, USA (streams, lakes, water quality, and groundwater levels). Annual Series. U.S. Geological Survey, Tallahassee, Florida, USA.
Reference ID: 291
Keywords: Water resources/Streams/Lakes/Water quality/Groundwater/Hydrology/Brad Jones/KCOL
Notes: Brent Anderson

Umbanhower, C. E., Jr., D. R. Engstrom, and E. C. Bergman. 2003. Reconstructing eutrophication and phosphorus loading for Lake Volney, Minnesota: Combining lake sediments and land-use history to establish 'natural' baseline for management and restoration. Lake and Reservoir Management 19:364-372.
Reference ID: 620
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

University of Florida. 2002. Summary of issues related to in-lake disposal of muck and/or aquatic vegetation. University of Florida, Department of Aqualtic Sciences/Institute of Food and Agricultural Sciences, Gainesville, Florida, USA.
Reference ID: 494
Keywords: Chris Carlson/KCOL/Brad Jones/Nutrients/Muck
Notes: Recorded by Brent Anderson 5/4/2005

Chris Carlson personal copy

This report is a summary of a meeting that was held to discuss the in-lake disposal of muck and vegetation. The professionals at the meeting identified issues of concern about in-lake disposal.

1. short term and long term fate of the islands
   a. nutrients and potential impacts to whole lake trophic status
   b. Impacts to general water quality
   c. Impacts to oxidation and mineralization of organics
   d. Habitat succession and wildlife utilization of islands
2. Cost versus benefits of in-lake disposal
   a. Fish habitats
   b. Access and general aesthetics of lake systems
   c. Cost of muck removal per year
   d. Cost of alternatives
3. Impact of in-lake disposal on mobilization of heavy metals and other chemicals

University of Miami Civil Engineering Department. 1973. Kissimmee River basin water quality model study. Central and South Florida Flood Control District, West Palm Beach, FLorida, USA.
Reference ID: 458
Keywords: Brad Jones/KCOL

Van Belle, G., and D. A. Meeter. 1975. Statistical analysis of aspects of the trophic state of selected Florida lakes. Technical Series. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Van Dyke, J. M. 1993. How To Create A Lake Management Plan. Department of Environmental Protection / Bureau of Aquatic Plant Management; in cooperation with Florida LAKEWATCH, Place of publication unknown.
Reference ID: 465
Keywords: Brad Jones/KCOL

VanArman, J., K. M. O'Dell, B. H. Welch, and S. Hill. 1993. Water quality in Lake Istokpoga, a shallow, macrophyte-dominated Florida lake. Draft Technical Publication. Deptartment of Research, South Florida Water Management District, West Palm Beach, Florida, USA.

Vis, C., C. Hudon, and R. Carignan. 2003. An evaluation of approaches used to determine the distribution and biomass of emergent and submerged aquatic macrophytes over large spatial scales. Aquatic Botany 77:187-201.
Reference ID: 633
Keywords: Canada/Biomass/GIS/Ecosounding/Mapping/Turbidity/Laura Carnal/SB/Vegetation
Notes: Recorded by Brent Anderson 6/02/2005

Wagner, T., and C. M. Falter. 2002. Response of an aquatic macrophyte community to fluctuating water levels in an oligotrophic lake. Journal of Lake and Reservoir Management 18:52-65.
Reference ID: 630
Keywords: Vegetation/SB/Biomass/Littoral zone/Substrate composition/Species composition/Idaho/Plant succession/Primary productivity/Coontail/Certophyllum
Notes: Recorded by Brent Anderson 6/02/2005

Walker, W. W., and K. E. Havens. 2003. Development and application of a phosphorus balance model for Lake Istokpoga. Lake and Reservoir Management 19:79-91.
Reference ID: 613
Keywords: Brad Jones/Water quality/Phosphorus/Mass balance modeling/Lake Istokpoga/Florida
Notes: Recorded by Brent Anderson 6/02/2005
Abstract: Hydrologic and phosphorus (P) mass balance models were constructed for Lake Istokpoga, a large shallow lake in Florida, USA. The objective was to use the models to determine whether there have been long-term trends in the processing of P by this lake, potentially impacting P exports to a downstream ecosystem (Lake Okeechobee). Higher lake P concentrations and outflow loads in recent years appear to be explained by higher runoff. A detailed basin survey will be needed to determine whether changes in land use in the predominantly agricultural and urban watershed also may have contributed to the increased P loads. Lake total P concentrations did not display a significant historical trend, nor did the lake's capacity

to assimilate P. A number of statistical approaches are demonstrated that could have general application in establishing nutrient mass balances for lakes with sparse datasets for tributary flows and/or concentrations. Daily simulations of lake phosphorus and chloride levels demonstrate the feasibility of dynamic mass-balance modeling in shallow Florida lakes using simple first-order phosphorus removal kinetics. The model developed here could be used in setting a total maximum daily load (TMDL) for P, once an in-lake concentration goal has been specified.

____. 2002. Development and application of a phosphorus balance model for Lake Istokpoga, Florida. Lake and Reservoir Management 19:79-91.
Reference ID: 466
Keywords: Brad Jones/KCOL

____. 1995. Relating algal bloom frequencies to phosphorus concentrations in Lake Okeechobee. Lake and Reservoir Management 11:77-83.
Reference ID: 589
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Wanielista, M. P., A. D. Zahm, Y. A. Yousef, L. B. Baldwin, and H. H. Harper. 1981. Excusive summary, Lake Tohopekaliga stormwater runoff project. University of Central Florida, Orlando, Florida, USA.
Reference ID: 296
Keywords: Kissimmee Basin/Osceola County/Lake Tohopekaliga/Water quality/Nutrients/ KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
Research goal is to develop a procedure to aid in the selection of the most cost effective stormwater management practice. For each land use, estimates of the physical characteristics of the land, cost of treatment and efficiencies of treatment were made. These estimates included the location of the various types of land used with their associated acreages, land cost, runoff potential under varying soil types, construction costs, operational and maintenance costs and yearly loading rates. From these assumptions, the least cost effective treatment combinations were determined for a fixed level of nutrient removal. A sensitivity analysis was done changing loading rates, removal efficiencies, and land costs.

Study Conclusions
Results indicated that stormwater management should be done for pasture, residential and commercial. The lowest cost for pasture would be berming, common both to P and N removal. For the urban lands, retention and detention with effluent filtration has been identified as cost effective.

Additional Comments
Land use loading data suspect. No actual or raw chemistry data- some pollutant load data as it applies to detention projects and model manipulation.

Wanielista, M. P. 1976. Non point source effects. Florida Technological University, College of Envineering, Environmental Systems Engineering Institute, Orlando, Florida, USA.
Reference ID: 293
Keywords: Kissimmee Basin/Orange County/Osceola County/Shingle Creek/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
General goals for the management of non-point source effects due to land use and water use modifications from the basis of the work presented by this report. Information will aid in minimizing the deleterious non-point source effects of runoff and infiltration from land and water alteration activities on receiving bodies of water, encourage the development and implementation of all plans consistent with 208's, encourage

information flow between citizens, scientists, engineers and governmental officials to understand the impact of non-point source effects on quality and development implementation solutions and keep abreast of developments in the state of the techniques of managing pollution from non-point sources.

Study Conclusions

Additional Comments
Good rainfall section (Shingle Creek).

Wanielista, M. P., Y. A. Yousef, and W. M. Mclellan. 1977. Non point source effects on water quality. Journal of the Water Pollution Control Federation 49:441-451.
Reference ID: 295
Keywords: Kissimmee Basin/Orange County/Osceola County/Lake David/Lake Eola/ Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
General objectives were to report on the development and use of an instrument that collects water samples used to document the nature and extent of non-point source effects and to present water quality response curves with calculated loading rates related to point and non-point sources. Results attempt to propose mass load standards, where appropriate, to determine waste load allocations.

Study Conclusions
No conclusions specific to water quality, but some conclusions on method of sampling, how often to sample.

Additional Comments
Lake Eola and Lake David Basins were sampled, not the lakes.
Lake Eola Basin was sampled in urban area of downtown Orlando.

Warne, A. G., L. A. Toth, and W. A. White. 2000. Drainage-basin-scale geomorphic analysis to determine reference conditions for ecologic restoration Kissimmee River, Florida. Geological Society of American Bulletin 112:884-899.
Reference ID: 467
Keywords: Brad Jones/KCOL

Water and Air Research, Inc. 1977. Trophic status and nutrient assimilative capacity in selected Central Florida lakes. Water and Air Research, Inc., Gainesville, Florida, USA.
Reference ID: 297
Keywords: Trophic status/Nutrients/Nutrient assimilative/Nutrient capacity/Lakes/Brad Jones/KCOL
Notes: Brent Anderson

Wegener, W., and D. Holcomb. 1973. An economic evaluation of the 1970 fishery in Lake Tohopekaliga, Florida. Pages 628-634 in A. L. Mitchell, editor. Proceedings of the Twenty-sixth Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners, Charleston, South Carolina, USA.
Reference ID: 353
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
Annual estimates of Lake Toho fishery standing crop for 1970. Data address the following metrics: (1) relative abundance of sportfish/centrarchids, (2) relative abundance of native fish, (3)relative abundance and species richness of forage fish, and (4) angler effort/harvest (creel).

What parameters were monitored?

See question above.

What was the geographic extent of monitoring?
Lake Tohopekaliga

How many samples or sample locations were monitored?
Twelve one-acre samples in limnetic zone
Fourteen one-acre samples in littoral zone
Six lake zones for creel survey

What was the sampling frequency and duration (period of record)?
Spring and Fall of 1970

Do these data cover the baseline or reference (pre-1960's) period?
Baseline period (1970)

Who collected the data?
Florida Game and Fresh Water Conservation Commission (FGFWFC)

Where are the data located? (agency or organization maintaining database)
FGFWFC not sure if raw data is archieved

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data quality is fair.

Are raw data and/or summarized data presented in the document?
Summarized data are presented in document

Is a summary of findings presented in the document?

Other notes:

Wegener, W., D. Holcomb, and V. Williams. 1974. Sampling shallow water fish populations using the Wegener Ring. Pages 663-674 in Arnold L. Mitchell, editor. Proceedings of the Twenty-seventh Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners, Charleston, South Carolina.
Reference ID: 357
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
Evaluated relative abundance, species richness, diversity, and biomass of forage fish in shallow (0-18 inches) littoral zone of Lake Tohopekaliga
.
What parameters were monitored?
Relative abundance, species richness, diversity, and biomass of forage fish.

What was the geographic extent of monitoring?
Lake Toho

How many samples or sample locations were monitored?
Ten transects with up to 6 samples per transect

What was the sampling frequency and duration (period of record)?
Quarterly samples collected over a one year period in 1972-1973.

Do these data cover the baseline or reference (pre-1960's) period?
Baseline period (1972-1973)

Who collected the data?
Florida Game and Fresh Water and Fish Commission

Where are the data located? (agency or organization maintaining database)
FGFWFC if it still exists

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Good

Are raw data and/or summarized data presented in the document?
Data are summarized

Is a summary of findings presented in the document?
Yes

Other notes:
Ten transects in water 0-18 inches were sampled within consecutive 3-inch contours in Late Toho from September 1972-June 1973. As water depth increased, non-centrarchid forage fish decreased while numbers of centrarchids increased. Total numbers of fish decreased from an average of 216,042 per acre in 0-3 inches to 20,326 per acre in 15-18 inches of water. Standing crop was relatively constant, averaging 91 pounds per acre for all water depth. Twenty six species were sampled.

These data will help develop the baseline condition for the metric associated with forage fish relative abundance, species richness, diversity, and biomass.

Wegener, W., and V. Williams. 1977. The effect of extreme lake drawdown on largemouth bass populations. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 354
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
The document provides on relative abundance of largemouth bass in Lake Toho between 1970 and 1976. It also provides data on size distributions for the species. Creel data also described.

What parameters were monitored?
Relative abundance and size distribution of largemouth bass (sportfish).
Angler effort for largemouth bass

What was the geographic extent of monitoring?
Lake Toho

How many samples or sample locations were monitored?
Uncertain

What was the sampling frequency and duration (period of record)?
Annual fall collections between 1970 and 1977.

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?

Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Unsure if raw data is manintained in FGFWFC database.

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data quality is fair.

Are raw data and/or summarized data presented in the document?
Data are summarized

Is a summary of findings presented in the document?
Yes

Other notes:
Standing crops of fish in vegetated areas increased from a high of 191 ponds per acre before the drawdown to 455 pounds per acre within two years after reflooding, but decreased to 315 pounds per acre in 1977. Largemouth bass weights averages from 9 to 22 percent of the total population, and averaged 15 percent. Increased reproduction is evident in 1971 and 1972 during and immediately following drawdown. These two strong year classes appear to be responsible of the increased harvest documented in creel census data from 1973-1975. Significantly larger numbers of intermediate sized (10" 13") occurred in 1972 and 1973, indicating excellent survival and growth of these young fish.

These data provide good summary of previous data, however quantitative data are provided in other reports. The report does provide good size distribution data.

____. 1974. Extreme lake drawdown, a working fish management technique. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 355
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
Provide general information on fishery standing crop and fishing success.

What parameters were monitored?
Angler effort and standing crop

What was the geographic extent of monitoring?
Lake Toho

How many samples or sample locations were monitored?
Not mentioned summary of data collected to determine response to 1971 drawdown.

What was the sampling frequency and duration (period of record)?
1968-1973

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
FGFWFC

Where are the data located? (agency or organization maintaining database)
Unsure if raw data maintained in GFC database

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data are poor.

Are raw data and/or summarized data presented in the document?
Data provided are a very general summary

Is a summary of findings presented in the document?
Yes, but data are brief.

Other notes:
Drawdown stimulated a significant improvement in the fish population. Standing crops of fish in vegetated areas increased from a high of 191 ponds per acre before the drawdown to 455 pounds per acre within two years after reflooding. Standing crops in open water increase from 59 pounds to 127 pounds per acre during the same time period. Forage and other non-sportfish accounted for a higher percentage of the fishery following reflooding, even though sportfish populations nearly doubled. The number of catchable sportfish also increased dramatically. Fishing success increased from 1.6 fish per man-hour in 1970 to 2.0 fish per man-hour in 1973.

These data are non-quantitative and merely summarize findings presented in greater detail in other documents.

____. 1975. Fish population responses to improved lake habitat utilizing an extreme drawdown. Pages 144-161 in W. A. Rogers, editor. Proceedings of the Twenty-eighth Annual Conference, Southeastern Association of Game and Fish Commissioners. Southeastern Association of Game and Fish Commissioners, Charleston, South Carolina, USA.
Reference ID: 356
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document provides data on relative abundance, biomass, species richness, and diversity of sportfish, native fish, and forage fish in Lake Toho before and after extreme lake drawdown. Sample methods included block nets and rotenone.

What parameters were monitored?
Relative abundance, biomass, species richness, and diversity of sportfish, native fish, and forage fish

What was the geographic extent of monitoring?
Lake Toho

How many samples or sample locations were monitored?
12 samples in limnetic zone
8 samples in littoral zone

What was the sampling frequency and duration (period of record)?
Biannual sampling in spring and fall between 1970 and 1973.

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)

Unsure if raw data is maintained in FGFWFC database.

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data quality is good

Are raw data and/or summarized data presented in the document?
Data provided are summarized.

Is a summary of findings presented in the document?
Yes

Other notes:
Drawdown stimulated a significant improvement in the fish population. Standing crops of fish in vegetated areas increased from a high of 191 ponds per acre before the drawdown to 455 pounds per acre within two years after reflooding. Standing crops in open water increase from 59 pounds to 127 pounds per acre during the same time period. Forage and other non-sportfish accounted for a higher percentage of the fishery following reflooding, even though sportfish populations nearly doubled. The number of catchable sportfish also increased dramatically. Fishing success increased from 1.6 fish per man-hour in 1970 to 2.0 fish per man-hour in 1973.

Abstract: An extreme drawdown conducted on Lake Tohopekaliga rejuvenated littoral substrate, stimulated development of desirable aquatic plants and increased macroinvertebrate production. As a result of these beneficial changes standing crops of fish littoral areas increased from a high of 191 pounds per acre before the drawdown to 455 pounds per acre during the same period. Biomass of sportfish nearly doubled, although forage fish accounted for a higher percentage of the population following reflooding. Individual species response to the drawdown varied. Numbers of harvestable size sportfish increased following reflooding. The monetary value of the Lake Tohopekaliga fishery increased by 37% or $6,222,186.

Wegener, W., V. Williams, and J. Buntz. 1973. Preliminary fish population investigations of Lakes Kissimmee and Hatchineha, Osceola County, Florida. Florida Game and Fresh Water Fish Commission, Kissimmee, Florida, USA.

Reference ID: 358
Keywords: LTMP/Fish/Lake Kissimmee/Lake Hatchineha/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document presents results of block net sampling to document parameters of fish communities within limnetic and littoral areas in Lakes Kissimmee And Hatchineha in 1973.

What parameters were monitored?
Relative abundance, species richness, diversity, and biomass for sportfish, native fish, and forgae fish. Size class distributions for sportfish.

What was the geographic extent of monitoring?
Lakes Kissimmee And Hatchineha

How many samples or sample locations were monitored?
12 samples in Lake Kissimmee
6 samples in Lake Hatchineha

What was the sampling frequency and duration (period of record)?
One year - 1973

Do these data cover the baseline or reference (pre-1960's) period?

Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Unsure if raw data still maintained in FGFWFC database

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data is of average quality

Are raw data and/or summarized data presented in the document?
Data provided in report are summarized

Is a summary of findings presented in the document?
Yes, findings are summarized in the document

Other notes:
Lakes Kissimmee and Hatchineha were sampled by FGFWFC in 1973 using block nets and rotenone. Sample were collected in Lake Kissimmee from 7 limnetic sites and 5 littoral sites. In Lake Hatchineha, 3 paired littoral and limnetic sites were sampled.

A total of 29 species were collected from Lake Kissimmee littoral samples. Dominant sportfish included bluegill (11.8%), warmouth (7.1%), redear sunfish (4.0%) and largemouth bass (3.3%). Dominnat forage fish included bluespotted sunfish (15,9%), shiner species (14.3%), bluefin killifish (12.8%), and dollar sunfish (21.4%). Limnetc samples supported fewer species (n=15) and were dominated by forage fish taxa (threadfin shad 20.4%, taillight shiner 36.1%, and shiner species 22.7%).

A total of 22 species were collected from Lake Hatchineha littoral samples. Dominant sportfish included bluegill (36.8%), redear sunfish (6.1%) and largemouth bass (6.0%). Dominant forage fish included taillight shiner (21.2%), tadpole madtom (8.7%), and threadfin shad (5.5 %). Limnetc samples supported fewer species (n=19) and were dominated by bluegill (30.1%), taillight shiner (27.1), tadpole madtom (13.0%), redear sunfish (10.7%), and black crappie (6.6%).

Welch, E. B., and G. D. Cooke. 1995. Internal phosphorus loading in shallow lakes: Importance and control. Lake and Reservoir Management 11:273-281.
Reference ID: 588
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Welch, E. B., and T. S. Kelly. 1990. Internal phosphorus loading and macrophytes: an alternative hypothesis. Lake and Reservoir Management 6:43-48.
Reference ID: 597
Keywords: Brad Jones/Water quality
Notes: Recorded by Brent Anderson 6/02/2005

Williams, V. P. 1980. Current status and future trend of the fisheries resources of Florida. Florida Game and Fresh Water fish Commission, Tallahassee, Florida, USA.
Reference ID: 360
Keywords: LTMP/Fish/Lawrence Glenn/KCOL
Notes: Recorded by Brnet Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?

What parameters were monitored?

What was the geographic extent of monitoring?

How many samples or sample locations were monitored?

What was the sampling frequency and duration (period of record)?

Do these data cover the baseline or reference (pre-1960's) period?

Who collected the data?

Where are the data located? (agency or organization maintaining database)

What is the quality of the data (QA/QC protocols? Certified sample collectors)

Are raw data and/or summarized data presented in the document?

Is a summary of findings presented in the document?

Other notes:

____. 2001. Effects of point-source removal on lake water quality: A case history of Lake Tohopekaliga. Lake and Reservoir Management 17:315-329.

Reference ID: 602

Keywords: Brad Jones/Water quality/Lake restoration/Point source removal/Phosphorus removal/Wastewater removal/Water quality trends

Notes: Recorded by Brent Anderson 6/02/2005

Abstract: Lake Tohopekaliga (9,840 ha) is part of the Kissimmee River system headwaters in central Florida. Point source discharges to the lake and its tributaries began in the 1950s. By the early 1960s four municipal wastewater treatment plants were discharging secondary effluent that contained high concentrations of phosphorus and nitrogen. Rapid population growth and treatment plant expansion began in the 1960s, and by 1969 the lake had experienced deterioration of water quality, aquatic habitat, and biological communities. By 1979, annual phosphorus loading to the lake was eleven times higher than under natural conditions and nitrogen loads had nearly doubled. Efforts to reduce phosphorus concentrations in effluent from the two largest point sources began in 1982, followed by complete removal of all wastewater treatment plant discharges by 1988. Ten years later, Lake Tohopekaliga had experienced reductions in total phosphorus (80 percent), ortho-phosphorus (95 percent), total nitrogen (50 percent), and chlorophyll a (30 percent). Secchi disk transparencies increased an average of 50 percent. Measurable improvements in water quality were also documented for downstream lakes Cypress, Hatchineha, and Kissimmee. No water quality changes were noted in neighboring East Lake Tohopekaliga, which served as a comparison lake for this study.

____. 1988. Impact of littoral plant communities on lake water quality. Page 10 in Proceedings of the 8th Annual International Symposium on Lake and Watershed Management.

Reference ID: 531
Keywords: Lake Kissimmee/Vegetation
Abstract: From 1977 to 1986 a series of quarterly water quality samples were collected and analyzed from 4 sites along an 800-m long transect on Lake Kissimmee, Florida, to test the assumption that healthy aquatic plants exert a beneficial effect on lake water quality. The site began at the lake edge and extended 50 m into open water beyond the littoral zone. While most of the parameters measured showed little change in relation to littoral zone communities, there were statistically significant increases (a 95% confidence limits) in sulfate, unfiltered turbidity, total phosphorus, and chlorophyll a levels in open water as compared to the water column in nearshore areas of the lake littoral zone. This paper discusses these changes in relation to the physical dimensions of littoral aquatic plant communities, and offers rational assumptions as to their causes.

____. 1980. Impact of sewage plant discharge on lakes of the upper Kissimmee River Basin. Florida Game and Freshwater Fish Commission, Kissimmee, Florida, USA.
Reference ID: 298
Keywords: Kissimmee Basin/Osceola County/Orange County/Shingle Creek/Rim Canal/Reedy Creek/Canoe Creek/Boggy Creek/St. Cloud Canal/Lake Kissimmee/Lake Hatchineha/Cypress Lake/Lake Tohopekaliga/East Lake Tohopekaliga/Mill Slough/Water quality/Nutrients/KCOL/Brad Jones
Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
Report written to acquaint County legislatures with existing problems associated with sewage plant discharge.

Study Conclusions
All nutrient concentrations measured, except pH, showed significantly higher values for sewage plants discharge than normal background. In May, 1979 and June, 1980, sewage plant discharge P concentrations were 44 and 49 times greater, respectively, than background. Lake Tohopekaliga receives between 1 and 2 tons/day sewage. Lake Apopka received 1956 lbs/day P when pollution was at worst (prior to 76) Lake Tohopekaliga, though 27% smaller in surface area and 21%lesser in volume receives up to 2 times the amount of P that is contributed to destruction of Lake Apopka from sewage alone. This excludes non-point which contributes up to 54% in Lake Apopka. Concentrations in claim generally decreased through lakes from North to South. Lake will probably suffer. Lake Apopka demise within the next 10 years.

Additional Comments
Brief report describes background studies. Procedures of 2 sampling trips in 1979 and 1980 - Report discusses only phosphorus but presents results of all analysis at 22 locations. Describes 4 sewage plants quality and quantity of discharge.

____. 1981. Length-weight relationships for largemouth bass in Florida. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 361
Keywords: LTMP/Fish/Largemouth bass/Lake Kissimmee/LakeTohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document provides data on size distributions of largemouth bass in Lake Toho and Kissimmee, as well as several other Florida Lakes. Data represent collections made between 1971 and 1981.

What parameters were monitored?
Size distributions of largemouth bass.

What was the geographic extent of monitoring?
Lakes Kissimmee and Toho (other Florida lakes also included)

How many samples or sample locations were monitored?
N/A

What was the sampling frequency and duration (period of record)?
1971-1981

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Unsure if raw data are maintained in FGFWFC database.

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Fair

Are raw data and/or summarized data presented in the document?
Summarized data

Is a summary of findings presented in the document?
Yes

Other notes:
This document provides summarized size distribution data for largemouth bass in Lakes Toho and Kissimmee from 1971-1981. Data provided include total numbers and average weight of collected fish in one inch length increments.

Data will be useful for describing baseline conditions for size distribution of largemouth bass (sportfish).

____. 1980. Major problems affecting lakes of the Upper Kissimmee River basin. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 359
Keywords: LTMP/Fish/KCOL/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document describes problems affecting sportfisheries of the Upper Kissimmee Basin due to water level stabilization and deterioration in water quality. Good document for discussing factors important for maintaining the fishery.

What parameters were monitored?
No direct parameters

What was the geographic extent of monitoring?
KCOL

How many samples or sample locations were monitored?
N/A

What was the sampling frequency and duration (period of record)?
N/A

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
N/A

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Overview of problems in basin; does not provide fishery data

Are raw data and/or summarized data presented in the document?
No

Is a summary of findings presented in the document?
No

Other notes:
This document is a good reference that describes deteriorating conditions that affect the fishery. It is helpful for highlighting conditions necessary to sustain the fishery.

____. 1990. Management and mis-management of the upper Kissimmee River basin chain of lakes. Pages 9-30 in M. K. Loftin, L. A. Toth, and J. Obeysekera, editors. Proceedings of the Kissimmee River Restoration Symposium. South Florida Water Management District, West Palm Beach, Florida, USA.
Reference ID: 469
Keywords: Brad Jones/KCOL/Chris Carlson
Notes: Recorded by Brent Anderson 4/28/2005
Abstract: Significant progress has been made in the management of lakes in the upper Kissimmee River Basin. This progress has come about as a result of aquatic habitat improvement using extreme drawdowns, increased knowledge of how these systems function biologically and hydrologically and elimination of point source pollution.
Substantial problems still remain, including permanently lowered lake levels, restrictive annual water level regulation schedules, upland drainage and related stormwater runoff, conversion of agricultural uplands to residential and commercial uses, lakefront development, management of exotic aquatic plants, and the failure of the state to establish ordinary high water line boundaries between sovereign and private lands. These critical problems threaten water quality, aquatic habitats, associated fish and wildlife populations, recreational uses, and both the aesthetic and economic values of these lakes. Unless several of these are satisfactorily resolved, the state's bold initiative to restore the Kissimmee River may fail; a river by definition cannot exist without an ample supply of flowing water of suitable quality.
Development pressures have reached the point where we are running out of time for corrective actions. The longer we procrastinate, the more difficult (if not impossible) these actions will become. The time to act is now; we no longer have the luxury of waiting for tomorrow.

Williams, V. P., and E. Moyer. 1978. Lake Tohopekaliga drawdown and long-term fishery management proposal. Florida Game and Fresh Water fish Commission, Tallahassee, Florida, USA.
Reference ID: 362
Keywords: LTMP/Fish/Sportfish/Creel/Lake Tohopekaliga/Lawrence Glenn/KCOL
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
This document provides very general trends in standing crop of sportfish and creel data associated with extreme drawdown of Lake Toho in 1971.

What parameters were monitored?
Standing crop of sportfish and creel.

What was the geographic extent of monitoring?
Lake Toho

How many samples or sample locations were monitored?
Not mentioned

What was the sampling frequency and duration (period of record)?
Not mentioned

Do these data cover the baseline or reference (pre-1960's) period?
Baseline

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Unsure if raw data maintained in FGFWFC database/

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data are poor

Are raw data and/or summarized data presented in the document?
Data provide very general summary of trends in standing crop and angler effort.

Is a summary of findings presented in the document?
No quantitative data are reported in this document.

Other notes:
This document is not useful for developing performance measures.

Williams, V. P., E. J. Moyer, and M. W. Hulon. 1979. Water level manipulation project. Completion report for study III: Lower Kissimmee basin study. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.

Reference ID: 363
Keywords: LTMP/Fish/Lake Kissimmee/Lawrence Glenn/KCOL/Macroinvertebrates/Drawdown/Joe Koebel
Notes: Recorded by Brent Anderson 3/31/2005

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1. **Creel Census and Fish Populations (Lawrence Glenn)**

How are the data in this document applicable to the metrics we are evaluating?
This document provides baseline data on relative abundance, species richness, diversity, and biomass of sportfish, native fish, and forage fish in Lake Kissimmee between 1974 and 1978.
Size distribution of sportfish also are reported.
Creel data also was collected for the same period of time.

What parameters were monitored?
Relative abundance, species richness, diversity, and biomass of sportfish, native fish, and forage fish
Size distribution of sportfish.
Angler effort

What was the geographic extent of monitoring?
Lake Kissimmee

How many samples or sample locations were monitored?

Blocknet samples were collected annually from 7 littoral and 5 limnetic sites.
Wegener ring samples were collected biannually from November 1974 through December 1976, and on a quartertly basis through 1978.
Creel data was collected between 1974 and 1978 from four subsection of Lake Kissimmee

What was the sampling frequency and duration (period of record)?

1974-1978; outlined above.

Do these data cover the baseline or reference (pre-1960's) period?

Baseline

Who collected the data?

Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)

Not sure if raw data are maintained in FGFWFC database.

What is the quality of the data (QA/QC protocols? Certified sample collectors)

Data quality is good

Are raw data and/or summarized data presented in the document?

The document provides summarized data.

Is a summary of findings presented in the document?

Yes

Other notes:

Data are too plentiful to summarize, but are covered in detail in the document.

This document contains very good summarized data for five of the six fish metrics (Relative abundance, species richness, diversity, and biomass of sportfish, native fish, and forage fish; size distribution of sportfish; angler effort).

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2. Macroinvertebrate studies (Joe Koebel)

How are the data in this document applicable to the metrics we are evaluating?

Provides data on littoral and limnetic benthic invertebrate species composition and density for Lake Kissimmee.

What parameters were monitored?

Benthic invertebrate composition and density

What was the geographic extent of monitoring?

Lake Kissimmee

How many samples or sample locations were monitored?

Three line transects were established in Lake Kissimmee. Data were collected at one-foot contours along each transect and consisted of four pooled Ekman grab samples or four pooled benthic core samples. Littoral vegetation was sampled with a sweepnet. One sample consisted of ten 5-foot long sweeps.

What was the sampling frequency and duration (period of record)?

Although the Methods section states that invertebrates were collected in 1974 and 1975, density data are presented from July 1978 and December 1978. A checklist of taxa collected between July 1974 and June 1979 also is included.

Do these data cover the baseline or reference (pre-1960s) period?
Baseline period

Who collected the data?
FGFWFC Staff

Where are the data located? (agency or organization maintaining database)
Originals are held be FGFWFC. One copy is held by SFWMD.

What is the quality of the data (QA/QC protocols? Certified sample collectors? Certified analytical lab? Chain of custody protocol?, etc.)
Unknown

Are raw data and/or summarized data presented in the document?
Yes.

Is a summary of findings presented in the document?
Yes.

Comments: This study presents a list of benthic invertebrate taxa and associated densities for limnetic and littoral samples in Lake Kissimmee during and following an extreme drawdown. Taxonomy is at the Family level which provides little information on the ecology of the organisms; however, relative abundances can provide some information on shifts in community composition following the drawdown.

J.W. Koebel Jr. 2/21/2005

____. 1982. Water level manipulation project. Completion report for study IV: Lake Tohopekaliga drawdown. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, USA.
Reference ID: 364
Keywords: LTMP/Fish/Lake Tohopekaliga/Lawrence Glenn/KCOL/Joe Koebel/Macroinvertebrates
Notes: Recorded by Brent Anderson 3/31/2005

How are the data in this document applicable to the metrics we are evaluating?
Temporal variation in angler effort, relative abundance of forage fish, sportfish, and native fish in Lake Toho before and after extreme drawdown completed in 1979.

What parameters were monitored?
Creel, Size distribution of sprotfish, Relative abundance and biomass sport, forage and native fish populations associated with limnetic, littoral and "shallow water" zones.

What was the geographic extent of monitoring?
Lake Toho limnetic, littoral and Shallow water areas.

How many samples or sample locations were monitored?
Four block net samples in littoral zone and 2 sample in limnetic zone in 1977-1978
Six block net samples in littoral zone 1979-1981
Nine littoral samples per year
Six lake areas prior to 1979 and three lake zones in 1979-1980 for creel survey

What was the sampling frequency and duration (period of record)?
Creel biannual (Spring, Fall)

Fish population
Block nets annual in Fall
Wegner rings biannual (April and December)

Do these data cover the baseline or reference (pre-1960's) period?
Baseline data are presented.
Creel 1970-1975, 1979-1981
Fish Population 1979-1981

Who collected the data?
Florida Game and Fresh Water Fish Commission

Where are the data located? (agency or organization maintaining database)
Completion Report F-29-11 Summarized data; not aware of location or existence of raw data

What is the quality of the data (QA/QC protocols? Certified sample collectors)
Data quality generally good

Are raw data and/or summarized data presented in the document?
Summarized data

Is a summary of findings presented in the document?

Other notes:

Wodzinski, R. J., and R. N. Gennaro. 1980. Decomposition and mineralization in detention/retention wetlands. Final Report. University of Central Florida, Coordination Council fo the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basins, Orlando, Florida, USA.

Reference ID: 299

Keywords: Kissimmee Basin/Osceola County/Okeechobee County/Armstrong Slough/Ash Slough/Water quality/Nutrients/KCOL/Brad Jones

Notes: Recorded by Brent Anderson 5/5/2005

Brief Description of Study
Presented are results of the first sampling period to determine the biochemical potential of microorganisms and how they change as the environment changes. The primary objectives were to study the biochemical potential of 2 detention- retention sites, Ash and Armstrong Slough and study the kinetics of nutrient mineralization and assimilation of carbon, nitrogen, sulfur, and phosphorus that are mediated by microbes.

Study Conclusions
The data indicated fairly significant rates of decomposition. In general, the sediments decomposed the material at a faster rate than the water column. There appears to be a correlation between the numbers of microorganisms possessing activity against substrate and the respiration rates noted for various sample sites. No nutrient data collected. Lab methods used to determine assimilative capacities.

Additional Comments
Ash and Armstrong Sloughs- surface water, water column, sediment and soil biologically oriented specific to microbe nutrient assimilation

Yerger, R. W. 1975. Aquatic vertebrate fauna of the Kissimmee River-Lake Okeechobee watershed. Technical Series, Volume No. 6. Florida Department of Environmental Regulation, Tallahassee, Florida, USA.

Yousef, A. 1976. Field investigation and wter quality responses. in M. P. Wanielista, editor. Non-point source workshop. Florida Technical University, College of Engineers. ESEI-76-3.

Zahina, J. G., K. Liudahl, T. Liebermann, K. Saari, J. Krenz, and V. Mullen. 2001. Soil classification database:

categorization of county soil survey data within the SFWMD, including natural soils landscape positions. Technical Publication WS-6. South Florida Water Management District, West Palm Beach, Florida, USA.

Zahina, J. G., K. Saari, and D. Woodruf. 2001. A functional assessment of South Florida freshwater wetlands and models for estimates of runoff and pollution loading. Technical Publication WS-9. South Florida Water Management District, West Palm Beach, Florida, USA.

Zebuth, H. H., M. Wanielista, and G. Baragana. 1975. Some non point source effects and abatement measures in Florida, USA. Pages 30-35 in Florida Technological Workshop, editor. Proceedings of the stormwater management workshop symposium. Florida Technological Workshop, Orlando, Florida, USA.
Reference ID: 300
Keywords: Kissimmee Basin/Istokpoga Basin/Highlands County/Polk County/Glades County/Okeechobee County/Osceola County/Orange County/Lake Tohopekaliga/Kissimmee River/Taylor Creek/Fisheating Creek/Arbuckle Creek/Lake Istokpoga/Shingle Creek/Water quality/Nutrients/KCOL/ Brad Jones
Notes: Recorded by Brent Anderson 5/6/2005

Brief Description of Study
Interviews conducted with county pollution control personnel and subregional and regional Department of Pollution Control personnel. Information requested on 4 general areas: (1) non-point source pollution problems which may exist in the agency's justification area, (2) methods used to discover the existence of these problems (4) Abatement methods currently in use.

Study Conclusions
Non-point source problems (I) urban- closed system lakes most susceptible to degradation of this type such as Orlando area. In Orlando metro area, urban runoff adversely affects Little Wekiva River, Howell Creek and Lake Howell, and Shingle Creek through which the problem is extended to Lake Tohopekaliga and the Kissimmee River. (II) Septic Tank No examples in area (III) Agriculture runoff Runoff of animal wastes contribute high coliform and nutrients. Boggy Creek as an example, also Taylor Creek, Kissimmee River, various parts of Fisheating Creek the problem extent is unknown. Lake Istokpoga receives flow from Arbuckle Creek which drains pasture. In addition, flowers are grown along the south shore (IV) miscellaneous no example in area (landfills, channelization activities, lock operation, mining) Problem Detection (agency personnel though observation or sampling, citizen complaints) Abatement, discussion, etc.

Additional Comments
Good commentary of why point source is so popular as opposed to non-point source. There has generally been very little documentation of the quantitative impact of non-point sources on water quality due to a shortage of funds, personnel, time, and a lack of specific enforceable regulations. Many of the non-point sources listed under problem areas have not been specifically documented with water quality data. Local agency representatives knowledge of area, land use activities and general water quality have indicated the existence of a non-point source problem. Summarizes agencies and individuals interviewed. Good general information and overview.

Zimmer, K. D., M. A. Hanson, and M. G. Butler. 2003. Interspecies relationships, community structure, and factors influencing abundance of submerged macrophytes in prairie wetlands. Wetlands 23:717-728.
Reference ID: 634
Keywords: Habitat characteristics/Species richness/Species composition/Fish/Plant succession/Vegetation/SB
Notes: Recorded by Brent Anderson 6/02/2005

Zittleman, N. J., R. R. Williams, and E. G. Buglewicz. 1982. Large-scale operations management test of use of the white amur for control of problem aquatic plants. Final Report. Miscellaneous Paper A-82-5. U. S. Army Engineer Waterways Experiment Station, Environmental Laboratory, Vicksburg, Mississippi, USA.