

# **COMPREHENSIVE PLAN FOR STORM LAKE WATER QUALITY PROJECT**

Storm Lake, IA

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### **Attachments**

1. Alternative Sediment Use Research Proposal (Managing Earth's Resources MER)
2. Storm Lake Restoration Diagnostic/Feasibility Study (June 1994)
3. Jim Ganske, Lake Reclamation Consultant Report

# Storm Lake

## Comprehensive Lake Management Plan

### Storm Lake 2002

#### Plan Summary

The Storm Lake Comprehensive Plan has been developed using the principles of Sustainable Development. Recommendations have been provided to preserve the natural character of the lake and surrounding watershed community, yet allow for safe growth of residential development and agricultural practices.

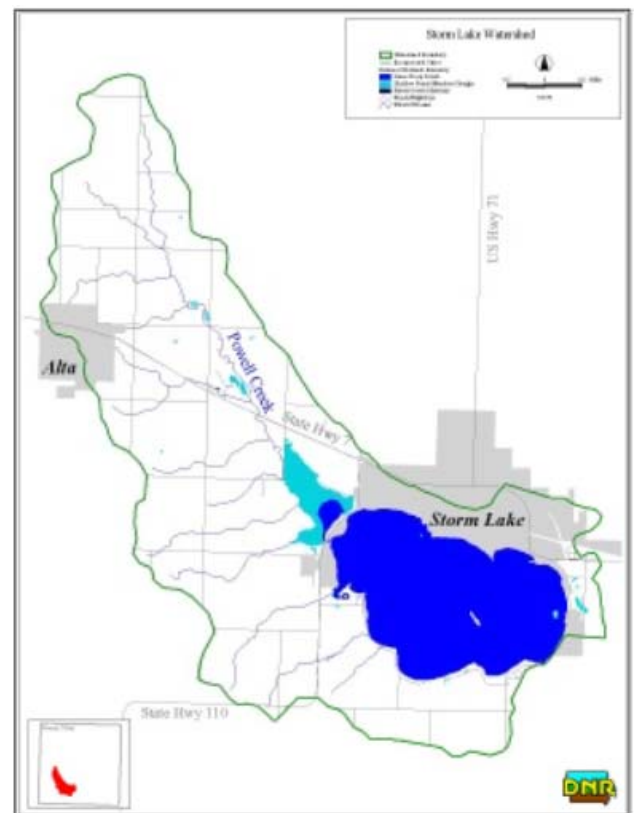
The plan has developed goals and recommendations organized around major watershed, parcel, and basin activities. Past emphasis has been placed on watershed protection and current activities are targeting lake restoration supported by a long-term dredging project and on-going watershed protection.

A local Water Quality Commission is being formed to oversee Storm Lake Water Quality Project. The Commission will be made up of eleven people as follows: 2 from Buena Vista County, 2 from City of Storm Lake, 1 from City of Lakeside, 1 from Iowa Lakes RC&D, 1 from Iowa DNR, 1 from Buena Vista SWCD, and 3 from Lake Preservation Association.

#### Characteristics Of Watershed

Storm Lake is located in Buena Vista County, Iowa. It is the shallowest of Iowa's few remaining glacial lakes. It is also the fourth largest natural lake in Iowa (behind Spirit Lake, West Lake Okoboji, and Clear Lake). Storm Lake has a length of about three and one half miles and is two miles in width. The area is approximately 3,147 acres. (Historical Analysis, Andersen). Storm Lake and its watershed outlet into the North Raccoon River and ultimately the Des Moines River, which flows southeasterly through our state. Storm Lake has an adjoining 190 acre marsh called Little Storm Lake located at the northwest corner of the main lake. The marsh is fed mostly by Powell Creek, which drains the largest portion of the watershed.

“The 13,770 acre watershed is predominantly level to moderately sloping land, primarily in the Sac-Primghar-Galva soil association. Approximately 11,250 acres of the watershed are currently cropland and are almost all in a corn/soybean rotation. Urban areas in the watershed constitute 1,700 acres. It includes the



unincorporated housing developments on the south and west sides of the lake, the Lake Creek development, the city of Storm Lake along the north side of the lake, the city of Lakeside to the east, and most of the city of Alta.” (NRCS, p.1)

Over thirty percent of the lake’s shoreline is public land. This includes two state areas, Little Storm Lake Management Area and the Casino Marina, one county park, South Cove Park, five Storm Lake city parks, one Storm Lake city campground, two Lakeside city parks and ten boat ramps. In addition to public access, Buena Vista University and Methodist Manor are located on the lakefront.

## History And Efforts To Improve Storm Lake

“The recorded history of Storm Lake begins in 1855 when the lake was named by a trapper traveling through the area. (Feasibility study, 1994, p.13).” On a number of occasions, water has reportedly stopped flowing over the lake’s dam for extended periods of time. The first time was in the late 1930’s to the mid 1940’s, and again in the 1950’s. A dredging project that affected 155 acres took place during the 1960’s. In 1977, the lake was down over four feet. Again in 2000, the lake was down an average of four feet. In the summer of 2001, there were many places where the lake was only two feet deep.

The Storm Lake community’s Lake Preservation Association was formed in 1991 and presently has over 100 members. The LPA has acted as a liaison between the DNR, the NRCS, landowners and the community. In addition, they have presented numerous programs over the years to educate the public about water quality issues. A few of the projects that the LPA has been involved with are:

- Giving away of a mulching lawn mowers to increase membership in the LPA.
- Cleaning up of beaches and sponsoring Storm Lake clean up days.
- Assisting with stenciling of storm drains
- Helping finance student help for Buena Vista University’s water quality studies.



In 1994 the Iowa Department of Natural Resources conducted a feasibility study for Storm Lake. In this study it is reported, “The Iowa DNR, Buena Vista College, Iowa State University, EPA, SCS and local citizens are presently cooperating on an intensive study of the watershed of Storm Lake. Local interest in the quality of Storm Lake is great.”(F.S.,



1994, p.8). A public meeting was held December 9, 1992, and similar meetings have taken place occasionally since that time.

The Storm Lake Watershed Protection Program began in June of 1994 and continued through 2000. The total investment in the watershed project was \$216,846.75 (NRCS, p.33) and included funding through Section 319 monies, WQIP, WPF, and local support. Many landowners in the watershed participated in this program and several of the practices continue today.

Since the initiation of this program much improvement has been made to control the silt entering Storm Lake. Buena Vista University has conducted water quality studies since 1991. During the summer of 2001, the studies showed negligible amounts of nitrates and silt running into the lake. The silt that lies at the bottom of the lake and the shallowness of the lake cause the turbidity. It has been suggested that a major dredging project resulting in a mean depth of 12 feet from 7 feet could last as long as 300 years.

The DNR and ISU are currently conducting the Iowa Lakes Study that includes Storm Lake. This is a five-year study and will give us further information about Storm Lake's quality.

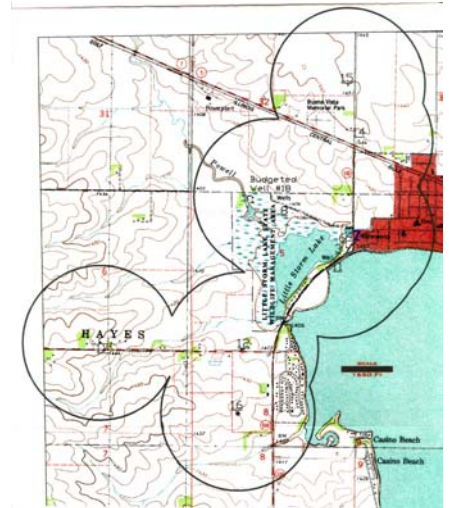
Since September of 2000, the City of Storm Lake has undertaken weekly monitoring of four storm sewer discharges. This monitoring is ongoing and will help determine management practices to improve water quality.

IBP has spent approximately \$100,000 to construct a storm water diversion structure to divert all of the storm water from their facility to their wastewater treatment plant.

Bil Mar has also rerouted their roof run off to their wastewater treatment plant.

The City of Storm Lake has recently developed and received approval of their interim wellhead protection plan. This allows land within 2000 feet of the city wells to be enrolled in CRP. Because of the location of the city wells, this area is in the lake's watershed and will be a benefit to the lake's water quality.

Finally, Chester Brecher has committed to a major water protection project. The project is in its final stages of completion and includes the construction of a three-acre pond that will serve as a large settling basin on Episcopal Creek to trap sediment as water flows from the creek to the lake. (Pilot Tribune)



## **Community Goals**

### **Sustainable Development Process**

As a framework to guide development of the comprehensive plan, the principles of sustainable development have been utilized. A variety of pressing environmental and economic opportunities and challenges face us today, and will also face our children in the future. The opportunities and challenges we have are of interest and should be of concern to all of us, especially in a county where much of the economy and lifestyle are dependent on a high quality environment. Sustainable development provides a means to protect our environment, provide economic growth opportunities, and enhance our society. This concept depends on the active involvement and participation of all citizens to find solutions to challenges, identify opportunities, and create the type of society that meets our needs and those of future generations.

The goals of environmental protection and economic development need not be conflicting; but can, in fact, be mutually reinforcing. Environmentally sound and sustainable economic development emphasizes the promotion of diverse economic opportunities while protecting the productivity and diversity of natural systems. There can be no sustained development without a clear commitment to the preservation of the environment and the promotion of wise and efficient use of all resources. In the absence of appropriate growth and development, it may be difficult to protect the environment.

Sustainable development can be a catalyst for development of new industries. Its benefits are many: including environmental enhancement, job creation, industrial development, and may include improved waste management and increased cooperation and involvement of its citizens.

The Storm Lake Comprehensive Plan is being developed around the goal of Sustainable Development. Sustainable Development requires a process of analyzing decisions in order to find a balance among economic activity, environmental requirements and the social needs of people. If this balance can be achieved all three concerns can be sustained.

To implement the process of Sustainable Development three objectives are called for:

1. Diversify and improve development and improve owner management practices in the lake area.
2. Sustain and enhance resource productivity and improve the environmental qualities and aesthetics of the Storm Lake Watershed.
3. Enhance the quality of life of each watershed resident and visitor.

### **Sustainable Projects**

Developing new and innovative ideas to protect water quality and quantity and create sustainable alternatives to treat waste materials are important goals for our water quality project. As part of this project we plan to evaluate three such initiatives and implement those that are feasible.

1. Evaluate alternative uses for dredge sediment. Uses such as blending sediment with other waste products to make and improved topsoil, blending and compressing sediment into blocks that might be used in construction, and blending sediment into a flowable type of product for molding shapes are being evaluated. (Managing Earth's Resources MER)
2. Evaluate developing a business associated with the Buena Vista Recycling Center, the Storm Lake Wastewater Treatment Plant, the IBP Wastewater Treatment Plant, and others for creation of a high quality potting soil. With this proposal, a building could be constructed adjacent to county, city, and IBP's sites which would house red worms used to break down food wastes and other cellulose materials presently going to landfill as well as wastewater sludge (biosolids) from the Storm Lake Wastewater Treatment Plant. IBP's covered lagoon system produces a reliable source of methane gas and a methane powered boiler system could heat the facility for little or no cost. High value worm castings could be blended with dredging sediment to produce a bagged high quality potting soil.
3. Incorporate the Green approach when planning new and restoring old urban lots and building developments. Through this approach each landowner takes responsibility for water that falls on his or her property. Natural and economical systems are put into place that minimize runoff and maximize soil absorption of rainwater. This type of approach ultimately benefits the lake. Water absorbed in the soil establishes a more reliable subsurface water source for the lake as well as reduces street flooding and pollutants being washed directly into the lake.

## **Information Development**

In order for Buena Vista County residents as well as other interested people to understand the Storm Lake Project, everyone involved needs to function effectively. They need to be supplied with accurate and clear information on the present and likely future growth of the Storm Lake Water Quality Project and area. This need prompted the Lake Preservation Association and Buena Vista University to develop a current information base. This information including this long-range plan can be found at the following web site: [www.bvu.edu/goto/SaveTheLake](http://www.bvu.edu/goto/SaveTheLake).

## **Storm Lake Water Quality Project Comprehensive Plan Goals**

The Comprehensive Plan has developed goals and recommendations organized around the following major areas: watershed, lakeshore, and basin. The objective of the Comprehensive Plan is to identify important aspects, accomplishments, and needs within these areas. Specific issues can be pulled from this plan to be given further study and action.

## **WATERSHED**

### **Land Use/Watershed**

#### **1. Agriculture Area**

##### Facts

- Completed EPA 319 water quality project in watershed of Storm Lake.
- Cooperated with Buena Vista University, Leopold Center for Sustainable Agriculture, NRCS and Buena Vista SWCD on various studies of watershed and surface and subsurface runoff.
- Implementation of Wellhead Protection Program around Storm Lake wells is just beginning.
- New Farm Bill will provide opportunities to further treat critical areas within the watershed.
- 11,250 acres (64%) of watershed is cultivated land.
- When agriculture best management practices are followed the agriculture land base is enhanced, water quality is maintained, and overall rural quality of life is preserved.
- Storm Lake watershed has no large livestock operations with manure management concerns. There are two smaller operations that are cooperating with the water quality project.
- Soil loss on cropland fields has been reduced to tolerable levels.

##### Issues

- When urban and agricultural interests meet, disagreements may occur between what are allowable practices relating to urban development and agriculture operations.
- Education activities for non-farm residents and lakeshore property owners regarding agriculture management practices should be facilitated.

##### Goals

- Preserve agricultural practices within the watershed region while improving sustainable development practices to maintain water quality.
- Support and encourage individual meetings between Soil and Water Conservation District representatives and each agricultural landowner to discuss current conservation plans and emphasize enrollment into available programs. These could include the Wellhead Protection Program, Wetland Reserve Program, Conservation Reserve Program, and other local, state, and federal programs, encouraging native grass, wetland and tree establishment. Also, if Conservation Security Program provision of the New Farm Bill is finalized, funding should be requested from USDA/NRCS by Iowa Lake RC&D to address Resource

Management planning and implementation needs of watershed operators and owners.

- Encourage interaction between farmers, rural residents, and lakeshore property owners.
- Establish a landowner recognition program for agricultural landowners doing an outstanding job managing their agricultural resources.

### Recommendations

- Encourage dialog between agriculture landowners, lakeshore property owners, and rural non-farm residents through the Lake Preservation Association and local institutions (e.g. churches, service clubs) and local service businesses (e.g. local bars/restaurants, and convenience stores).
- Encourage the preservation of quality agriculture land in Storm Lake Watershed by supporting cooperative efforts between rural agriculture landowners, the Lake Preservation Association, and non-farm residents.
- Provide technical and financial assistance to agricultural operators to encourage management of crop production in a way that benefits wildlife such as waterfowl and other wildlife by maintaining high crop residue levels, food plots and buffer areas.
- Discourage the establishment of large-scale livestock feeding operations within the Storm Lake Watershed. Possibly develop zoning to prohibit large-scale feedlots within watershed.

## **2. Urban Area**

### Facts

- 10% of watershed is urban.
- The Storm Drain Stenciling project on streets and sidewalk alerts people not to discard any grass clippings, waste oil, etc. on streets or into the storm sewers.
- Runoff from more than half of Storm Lake city streets enters the storm drain system and flows directly into lake.
- Lake walking/biking trail through city of Storm Lake is being completed.
- Sanitary sewer checks of onsite systems were completed in 2000, during the low water period, by DNR, City, County, and City of Lakeside, and all improper discharges were checked and problem resolved.
- The City of Storm Lake monitors the discharge from four storm sewers on a weekly basis.
- Signs have been placed at each storm sewer outfall within the City of Storm Lake providing a phone number to report any unusual discharges.
- Community service organizations provide leaf pick-up program in the spring and fall.

### Issues

- Some urban residents are uninformed regarding proper application of lawn fertilizers and pesticides.
- Some construction areas are not properly managed to minimize erosion off the construction sites.
- Some individuals and businesses in urban area lack knowledge regarding urban runoff into lake.

#### Goals

- Increase monitoring of the storm drain discharge into lake.
- Look for opportunities to create wetlands for storm drain discharge to flow into before entering lake.
- Expand and emphasize education program regarding city runoff into lake.
- Monitor construction sites for erosion off site (both private and city construction).
- Investigate storm sewer inlet filtering devices.
- Expand leaf pickup program in fall of year.
- Assist lawn services to implement a lawn care program that emphasizes nutrient and pest management rather than just automatic preventative applications of chemicals.
- Provide incentives to residents to identify harmful situations such as improper sewage disposal, improper waste disposal, and septic tank concerns.

#### Recommendations

- Set up a schedule to install storm sewer inlet filters to keep litter out of sewers draining to lake.
- Investigate a city-wide leaf pickup program to minimize leaves washing directly into lake.
- Start education programs to minimize fertilizer and pesticide application to lawns.
- Establish a storm sewer water fee that is part of each month's water and sewer statement to provide funding for addressing urban surface water runoff problems.

### **3. Rural Area (Farm and Non Farm residences)**

#### Facts

- 500 acres (3%) of watershed is farmstead/rural residences or rural residential development complexes.
- Creation of additional public areas will encourage new residential development.
- Many rural non-farm developments are small and owners depend on Storm Lake and land within its watershed for business development and recreational activities.
- Rural residents are responsible for installing and maintaining an appropriate sanitary sewer system and water supply.
- County permits are required for construction of private well and sewer system. Contractors are aware of this requirement and follow it.

- Few private wells and septic systems are monitored for performance and most are operated without maintenance plans.
- Development changes the rural landscape of the watershed and may pose new issues for both water quality and agriculture.

### Issues

- Few private wells and septic systems are monitored for performance and most are operated without maintenance plans.

### Goals

- Manage development so it does not spoil the rural character of the watershed.
- Manage rural business development so that toxic materials are not purposely or accidentally washed or leached into lake (e.g. junk yards, auto body shops, lawn care businesses, farm chemical dealers, etc.).
- Encourage use of cost share administered by County Sanitarian for plugging abandoned wells.

### Recommendations

- Continue and improve education programs that promote lawn and vegetative management practices that protect surface and groundwater resources.
- When available, utilize state and local financial resources such as low interest loans and grants to assist individuals in upgrading individual sewage disposal systems.
- Manage rural development.
- Encourage cluster development to preserve the rural landscape.
- Encourage use of “Grants to Counties” funding for private well testing.
- Start programs that work with realtors and others connected with land development and the sale process to accurately and effectively explain to buyers the rules for governing their land purchase and future use of their land.

## **4. Recreation Area**

### Facts

- The continuing increase in both permanent and seasonal populations is putting pressure on public lands for outdoor recreation purposes.
- During the summer, lakeshore residents of both seasonal and permanent homes recreate on the land near Storm Lake almost as much as they participate in water-based recreation activities.



- Lake and shore land recreation activities are increasing by both residents and non-residents while the resource base remains the same. As private land parcels become smaller and increase in value, public outdoor recreation activities will concentrate on public lands.
- Most recreation demand in the summer is on the weekends.
- For Iowa population as a whole, walking/hiking and biking constitute 61% of all outdoor recreation activities.
- Activities such as nature observation and sight seeing coincide with walking/hiking and constitute 41% of total Iowa outdoor recreation.
- Almost one-quarter of all Iowa outdoor recreation includes the water oriented activities of fishing, swimming, and boating.
- Fishing activities account for 45% outdoor recreation activity.
- The dominant winter recreation activities are walking/hiking/cross country skiing, snowmobiling, and ice fishing.
- There is currently approximately 7 miles of developed lake trail.
- The city has plans and funding to expand the lake trail in 2002.

### Goals

- Target an additional 200 acres of private land be purchased for development as public use (e.g. camping, hunting, natural areas and wetlands).
- Develop and maintain a system of trails for diverse types of outdoor recreation in areas that are scenically attractive and circle the lake.
- Target area around Little Storm Lake Management Area for a new interpretive trail system that will serve to educate public about the benefits of a wetland ecosystem as well as provide a relaxing area to walk. The close proximity to the Storm Lake Middle school will make it ideal for school field trips.

### Recommendations

- Look for opportunities to expand public land base through use of programs like Wetland Reserve Program with assistance from partners such as Pheasants Forever, Ducks Unlimited, County Conservation Board and DNR.
- Develop plan for land acquisition and trail expansion around Storm Lake and Little Storm Lake.
- Explore joint management opportunities on private land such as marinas, campgrounds, and trail areas.

## **Resource Characteristics/Watershed**

### **1. Erosion/Pollution**

#### Facts

- Approximately 11,250 acres of watershed are in intensive row crop production.

- Conservation practices applied to date:
 

Conservation Tillage	6900 acres
Contour farming	222 acres
Integrated Crop Management	7000 acres
Terraces	7850 feet
Waterways	34.8 acres
Pasture/Hay Planting	89 acres
Filter Strips and Wetland	87.3 acres
Wildlife Habitat	87.3 acres
Well Closures	8
- Cropland soils are generally Sac-Primghar-Galva soils, which are level to moderately sloping.
- Need to utilize local, state, and federal programs to further protect lake by establishing native grass plantings and wetland development.

### Goals

- Protect and enhance wetland and native planting resources through management polices that maximize the functions and benefits these resources provide.
- Protect the quality and level of surface and groundwater resources in Storm Lake Watershed.
- Protect groundwater from both agriculture and urban contamination sources.
- Look for opportunities to develop wetlands on main tributaries flowing into lake.

### Recommendations

- Expand, protect and actively manage native grass planting and wetland resources to safeguard the surface and groundwater quality entering Storm Lake.
- Consider nutrient removal in wetlands as a water quality management tool.
- Prioritize agriculture resources needing top priority ranking in best management practices or grants to improve management.

## **Public Management Responsibilities/Watershed**

### **1. Public Land**

#### Facts

- Approximately, 190 acres of watershed is owned by the state: includes Little Storm Lake Management Area and area surrounding it.



- The County Conservation Board owns three acres of the watershed called South Cove Park.
- A primary interest of DNR in Storm Lake is its fishery. Walleye eggs harvested from Storm Lake are the primary source of fry for stocking northwest Iowa Lakes.

Goals

- Increase the acres of public land in the Storm Lake Watershed.
- The lands held in public ownership need to be managed, protected, and preserved in the best interest of wildlife, public, and lake users and to enhance outdoor recreation.

Recommendations

- Restore, manage and preserve wetlands for water quality benefits and nutrient management.

**2. Infrastructure**

Issues

- There are City, County and State roads within the watershed.

Goals

- Storm water runoff management for city and county developments shall emphasize the ponding of runoff in natural or created wetlands to maximize nutrient and chemical uptake before entering lake (e.g. road culvert drop structures, impoundments and wetlands).
- Encourage good winter road management of salt and ditch management regarding erosion control.



**3. Government Boundaries**

Fact

- Joint City, County and State planning is needed for appropriate growth around lake.

Goals

- Encourage a joint governmental planning process to assist future growth and capitalize on existing programs that might assist in funding infrastructure projects.

- Create opportunities for future safe growth to guarantee Storm Lake and Buena Vista County as a viable community and county.

### Recommendations

- Review benefits of joint city/county zoning to provide further protection to the lake and manage growth to preserve health and aesthetics of lake.

## **SHORELINE**

Parcels are the base level of management. Parcels that touch water, whether privately or publicly owned, produce both community and individual impacts. Prime community impacts include water quality, fish and wildlife production, and economic development. Individual impacts derive from recreational development and fair land value assessment.

### **Community Impacts/Shoreline**

#### **1. Yard Management**

##### Facts

- Excessive lawn chemical use impacts shoreline and can leech or runoff into the lake.

##### Issues

- Intensive lawn management has very high levels of fertilizer and chemical input equivalent to intensive agriculture.
- The knowledge of parcel owners on the impact of lawn management practices and water quality resources need to be improved.

##### Goals

- Develop lawn management practices that minimize nutrient or chemical contributions to the lake.
- Incorporate landscaping techniques, such as rain gardens, that utilize natural filtering effects before surface runoff enters lake.
- With assistance from DNR, Buena Vista Soil and Water Conservation District (SWCD), and local lawn services develop guide for yard and shoreline management planning purposes.

##### Recommendations

- Continue and improve education programs that promote lawn and vegetative management practices that protect surface and groundwater resources.
- Promote an effective and low cost education program that emphasizes yard vegetation and lawn management practices that protect surface and groundwater quality.

## **2. Waste Management**

### Fact

- There are several developments around the lake operating on-site sewer systems.

### Issues

- There is a need for septic system maintenance plans.
- There is a need to begin planning for a sanitary sewer collection system that circles the lake and connects to city sewer treatment plant.
- There is a high potential for storm water runoff from lots in high density development areas where there are impervious surfaces (e.g. driveways, streets, and parking lots).
- In the past, several residences were only used seasonally, however most of these have been converted to permanent residences putting more pressure on old septic systems.

### Goals

- Work with County Sanitarian to help landowners with on-site sewer systems develop maintenance plans for their systems.
- Begin planning to construct sanitary sewer collection system around lake.
- Develop a storm water plan to be implemented for high-density areas, such as subdivisions, to accommodate for the cumulative impacts of yard management and runoff from streets and driveways.
- Evaluate potential for wetland filtering areas.

### Recommendations

- Investigate new technologies for storm water and sewer treatment.
- Investigate implementing existing technology for new building and construction sites.

## **3. Shoreline Management**

### Facts

- Proper vegetation management can lead to greater amounts of wildlife diversity and populations.

- Viewing wildlife is a major recreational activity of lake users.
- Proper vegetation management can lead to lower populations of nuisance insects.
- 30% of shoreline is in public access. Less than 10% of lakeshore is developed into residential lots.

### Issues

- Shoreline area is the most sensitive area of a watershed. It is a danger zone for erosion and provides natural habitats for many wildlife species, such as fish, shore birds, and waterfowl.
- As the price of lakeshore property rises, ownership is divided or used more.

### Goals

- Develop shoreline management guidelines for appropriate segments of shoreline around lake that maximize natural characteristics of existing shoreline to enhance fisheries, wildlife diversity and maintain high water quality.

### Recommendations

- Assist Buena Vista SWCD to fund a part-time employee to work with homeowners around lake on shoreline and lawn management plans.
- Continue and expand the City “Adopt a Park” for on-going shore clean-up and maintenance.

## **4. Development**

### Facts

- Over thirty percent of the lake’s shoreline is public land. This includes two state areas, Little Storm Lake Management Area and Casino Marina, one county park (South Cove Park), five Storm Lake city parks, one Storm Lake city campground, two City of Lakeside parks and ten boat ramps. In addition to public access, Buena Vista University and Methodist Manor are located on the lakefront.
- All developed areas around the lake have access to Storm Lake Water System for quality drinking water.
- Most of the city of Storm Lake’s drinking water comes from deep wells located near the Little Storm Lake Management Area.

### Recommendations

- Complete Storm Lake Wellhead Protection Program and encourage use of CRP to protect city wells with the added benefit of protection in the watershed

# LAKE BASIN

## Recreational Management/Lake Basin

### 1. Fish Management

#### Facts

- Fish habitat/littoral areas are important areas to be maintained.
- High quality walleye lake used by DNR for production purposes.
- Several types of game fish exist in Storm Lake.
- Threat of fish winter kill exists because of shallow water conditions.
- Water depth from sediment buildup causes problems for wildlife and recreation.
- Island deterioration occurs due to wind and wave action.
- Dredging projects have removed amounts of sediment on two separate occasions in the lake's history.
- During the last 2 years lake activities have been reduced considerably because of low water level.



#### Goals

- Dredge a significant portion of lake to insure quality fish population, avoid winterkills, and improve all recreational aspects of lake.
- Minimize shoreline disturbances to protect littoral areas.
- Investigate dredging a small portion of Little Storm Lake Management Area.
- Expand island on east side near campgrounds with dredge sediment by using Geo Tech type material and/or sheet piling. Connect refurbished island to Lake Trail via a handicapped accessible bridge, which boats can travel under. The refurbished island will also protect new DNR boat landing from large waves during windy conditions.



### 2. Water Surface Management

#### Facts

- Increasing number of large speed boats sharing the lake with an also increasing number of small personal watercraft and sailboats.

- Large numbers of fishing boats also use the lake for trolling and anchor fishing.
- Beach, dock and shoreline fishing has been increasing for several years.
- Public perceptions of Storm Lake will change as water clarity improves.
- By maintaining Storm Lake as a high quality public use water body it will take pressure off other northwest Iowa lakes.

#### Goals

- Dredge large portion of lake to improve recreational boating safety.
- Make recommendations in collaboration with DNR on safe boating practices for lake.
- Analyze lake use by boats and make recommendations on such restrictions as boat size, speed and noise level.

### **3. Exotic Species**

#### Fact

- Currently purple loosestrife is a problem within the watershed and Little Storm Lake area.

#### Goals

- Work with DNR to insure that other exotic species do not accidentally enter lake by boat or other recreational equipment.
- Eradicate purple loosestrife

#### Recommendations

- Put more emphasis on an information program to alert lake users of this potentially serious problem.
- Continue to work with local, county, and state officials to eradicate purple loosestrife.

### **4. Riparian Public Land**

#### Facts

- There are four high quality public boat accesses to lake maintained by DNR.
- There are four semi developed public beach areas for swimming.
- Large areas of easy access to public fishing exist around the lake primarily in city limits of Storm Lake.
- City began “Adopt a Park” program in spring 2002.

Issue

- Miscellaneous trash sometimes accumulates along the shoreline of lake.

Goals

- Maintain good public access areas to the lake for all residents and visitors to use.
- Encourage local groups to adopt portions of shoreline to maintain similar to DOT's adopt a highway. Signs would be erected along shoreline recognizing groups.
- Maintain high profile education programs regarding littering and problems it causes.

# **DREDGING OF LAKE BASIN**

## **Goals Of Dredging**

1. Restore lake to a high quality multi use lake.
  - Fishery
  - Recreation
  - Wildlife
  - Aesthetics
  
2. Enhance viability of Storm Lake and Buena Vista County
  - Encourage people to choose Storm lake as their home
  - Encourage high quality businesses to come and stay in Storm Lake and Buena Vista County
  - Encourage and expand tourism potential of Storm Lake, Buena Vista County and northwest Iowa area.
  - Encourage economic development

## **Watershed Preparation**

In the last 10 years much planning and work has been completed within Storm Lakes Watershed. Landowners have applied conservation practices, Buena Vista University has and continues to study runoff water quality. The new Farm Bill will open additional doors for more intense conservation activities such as native grass seeding and wetland development.

## **Dredging of Storm Lake**

Addressing lake basin concerns is next. Many aspects of Storm Lake's Comprehensive Plan focus around benefits of a large scale dredging project for the lake. This dredging plan is the result of much work by local community leaders. The dredging plan has been broken into three phases.

### **Phase 1:**

Lake and watershed Diagnostic/Feasibility Study completed in June of 1994. (Attached)

### **Phase 2:**

DNR funded dredging project. This phase will be completed during summer of 2002. Approximately 180 acres will be dredged with spoils deposited in basins on south side of the lake.

**Phase 3:**

This phase has also begun. Local planning is being completed, local funding sources are working together to enter into a long-term dredging project that will not end until approximately 1,500 to 1,800 acres of Storm Lake is dredged to appropriate depths.

Within phase three of the project, the lake Water Quality Commission will continue to develop new spoil sites that have been identified around the lake basin. Alternative sediment uses will also be investigated along with special equipment designed to dewater dredge sludge, which will allow drier sediments to be hauled away from site rather than building basins for storage and drying.

The dredging plan for Phase Three is based on recommendations made by Lake Reclamation Consultant Jim Ganske of Sleepy Eye, MN. A special study and report was completed for Storm Lake. In the study, Mr. Ganske recommends removing 14 million cubic yards of sediment from 2,400 acres of the lake over a 10 to 15 year period. Storm Lake's plan is to dredge 1,500 to 1,800 acres over a 5 to 10-year period. This dredging will increase water-holding capacity by 40%. In that study recommendations were made regarding startup and annual costs of dredging project. These costs are reflected in Storm Lake's proposed dredging budget.

## Dredging Budget

### Dredging Costs First Year (2003)

<u>Setup</u>	<u>Costs</u>
First Year Dikes	\$390,000
Dredge	\$600,000
Dredge Pipe (10,000 ft)	\$180,000
Dredge Tender	\$ 50,000
Jon Boat and Motor	\$ 10,000
Pipe Fusing Machine	\$ 24,000
Contingency	\$125,000
First Year Operating Cost	\$496,000
<b>Total First Year Cost</b>	<b>\$1,875,000</b>

### Local Funding Plan For First Year (2003)

<u>Source of Funding</u>	<u>Contribution Amount</u>
City of Storm Lake	\$600,000
Buena Vista County	\$600,000
Private (local fundraising)	\$300,000
<b>Total Local Funding</b>	<b>\$1,500,000</b>
<b>Request to Iowa DNR</b>	<b>\$375,000</b>
<b>Total Funding for First Year Dredging</b>	<b>\$1,875,000</b>

**Dredging Costs (Annual)**

<u>Annual Expenses</u>	<u>Costs</u>
Deposit Sites-dike construction-rent	\$296,600
Fuel - 3,200 gallons/week – 35 weeks, cost \$1.10/gallon	\$123,200
Labor - \$50+ per hr. (4 persons) – 35 wks (\$2,250 wk/35 wks)	\$ 80,000
Unemployment, employee benefits – 25%	\$ 24,000
Consultants fees 1 <sup>st</sup> year – (2 <sup>nd</sup> year 50% less)	\$ 40,000
Supplies and repairs	\$ 42,000
Insurance, permits, mileage, etc.	\$ 25,000
Contingency 10%	\$ 69,200
<b>Total Annual Costs</b>	<b>\$700,000</b>

**Local Annual Funding Plan (5 year period)**

<u>Source of Funding</u>	<u>Contribution Amount</u>
Local Fund Raising (Grants: Foundations, Federal & State Appropriations, Private) \$100,000 X 5 Years	\$500,000
State of Iowa \$600,000 X 5 Years	\$3,000,000
<b>Total For 5 Years</b>	<b>\$3,500,000</b>

## **Comprehensive Plan Summary**

Storm Lake will continue the process of long-range planning. In this plan we have identified many sustainable recommendations for our lake. Storm Lake Water Quality Commission will coordinate and monitor the implementation of these recommendations of the comprehensive plan.

The Storm Lake Comprehensive plan represents a commitment on behalf of many levels of government, business, rural and urban residents, diverse cultures, and community and environmental groups. We hope this plan and project can be a model for other lakes with similar concerns.

Local communities will be actively involved in politically supporting funding for Iowa DNR and it's programs. Storm Lake and surrounding communities in northwest Iowa are grateful for the investment of time and money from Iowa DNR into our lake. A healthy and sustainable lake is vital to the City of Storm Lake's and Buena Vista County's successful future. For the first time in the history of the lake and it's surrounding communities, a unified determined effort is being put forth to improve and protect the lake and its watershed for the next century and beyond.

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