

---

# **Restoration and Protection of the Water Resources of the Greenwood Lake Watershed in New Jersey**

---

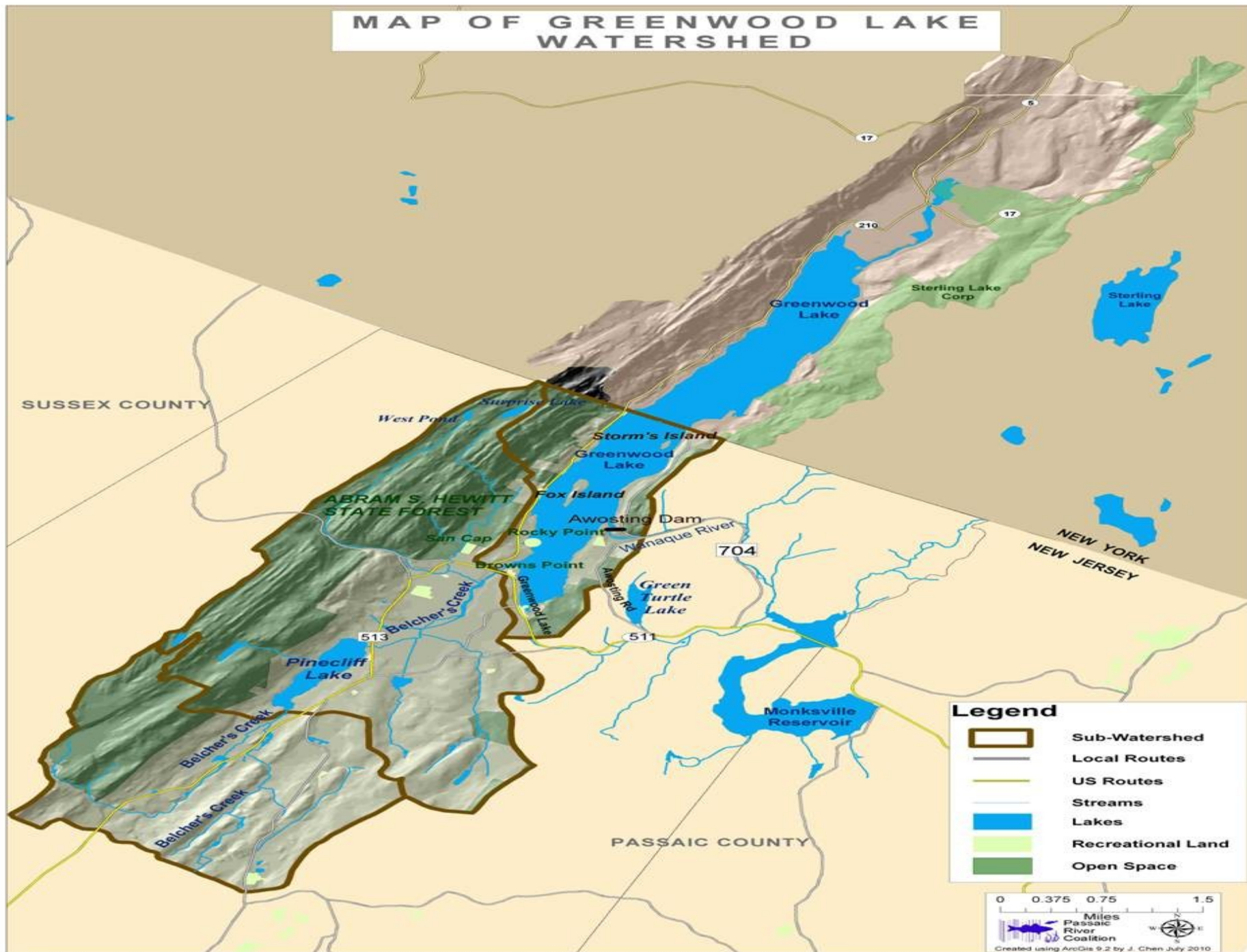


# Greenwood Lake Commission

- Bi-state commission that was formed in 2001 for the express purpose of improving the water quality of this beautiful lake
- Help ensure that the natural, scenic, and recreational resources of Greenwood Lake and its watershed are protected, so that the pristine beauty of the area will be preserved and maintained for the enjoyment and recreation of present and future generations.



# MAP OF GREENWOOD LAKE WATERSHED



# Current Uses

- Watershed has been under extensive development pressure in recent years
- Land use categories including Residential; Recreational; Industrial, Commercial and Transportation; Woods, Horticulture, Meadow and Marsh; and Other Urban or Built-up Land



# Current Uses

- Future development must be carefully planned and concentrated in suitable areas, so as to minimize negative ecological impacts.
- The 2004 Highlands Water Protection and Planning Act severely limited the development in this critical region. However, without proper planning, the existing population levels will threaten the integrity of the lake and the surrounding ecosystems.





# Why We Need a Restoration Plan

- **Recreational Use**
  - Improve both boating and swimming purposes
  - Improve recreational fishing
- **Aesthetics**
  - Reduce the amount of weeds
  - Reduce algae growth





# Why We Need a Restoration Plan

- **Drinking Water**
  - **Lake feeds into 2 reservoirs that provides water to nearly 3 million New Jersey residents and businesses.**
  - **We need to protect this water source from contamination**



# IMPROVING NATURAL RESOURCES AND RECREATION OF GREENWOOD LAKE

- Reducing Eutrophication in Greenwood Lake By:
  - ❑ Lake Drawdown (lowering the water level)
  - ❑ Dredging of Greenwood Lake
  - ❑ Weed Harvesting
  - ❑ Controlling Nuisance Aquatic Plants by Chemical or Biological Techniques

Eutrophication is an increase in the concentration of chemical nutrients in an ecosystem to an extent that increases the primary productivity of the ecosystem.





# **REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE**

- **Nitrogen Loadings: Nitrogen is more likely to enter waterways from ground water or air-borne sources than phosphorus. These sources include septic systems which are leaching pollutants into ground water. Sewage treatment plants are another source of nitrogen.**





# **REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE**

- **Nutrient Loadings from Groundwater and Base Flow Influx: Not all nutrients and pollutants are washed into the lake or Belcher Creek in storm water runoff. Some, such as soluble nitrogen compounds and dissolved organic matter, seep into Belcher Creek or Greenwood Lake in base flow.**





# **REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE**

- **Nutrient Loadings within the Belcher Creek Watershed: Purple loosestrife and parrot feather have invaded the shoreline of Pinecliff Lake. All the waters of the Greenwood Lake Watershed in New Jersey are either Category One (C1) or Nondegradation (FW1) waterways which should be protected from degradation.**



# IMPROVING WATER SUPPLIES

- Reducing the Deficit in Ground Water Availability in the Greenwood Lake Watershed
- Protecting Lands with High Water Resource Values
- Increasing Ground Water in Storage
- Reducing Ground Water Withdrawals
- Improving Base Flows
- Improving the Availability of Water from the Greenwood Lake Watershed





---

# IMPLEMENTING THE HIGHLANDS REGIONAL MASTER PLAN

- Pursuing the Purposes of the Highlands Water Protection and Planning Act
- Conforming to the Highlands Regional Master Plan
- Land Use Capability Zoning



# HIGH PRIORITY ACTIONS



# User Fees

- While the Commission has accomplished several major projects since its inception, which were funded by various governmental sources, it has been seriously limited by a lack of operational funding. Though the Commission was created by state agencies, the State of New Jersey will not provide a budget for it.



# User Fees

- A partial solution to this problem is the implementation of a user fee program for boaters on Greenwood Lake. A user fee will be collected starting in 2010. Revenue from the user fee will help fund the Commission's administrative operations and initiatives outlined in this action plan.





# **IMPROVING NATURAL RESOURCES AND RECREATION OF GREENWOOD LAKE**

- **Weed Harvesting- Continue weed harvesting operations.**
- **Lake Drawdown- Continue drawdowns every four years**
- **Stump Reduction- Utilize a \$90,000 federal grant to implement a stump reduction project during the next drawdown of Greenwood Lake**



# **IMPROVING NATURAL RESOURCES AND RECREATION OF GREENWOOD LAKE**

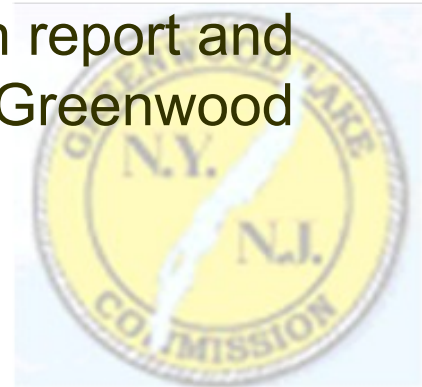
## **■ Dredging**

- ❑ Review the dredging parameters recommended in the HydroQual study and pursue these recommendations**
- ❑ Obtain funding for dredging project.**
- ❑ Write an RFP for dredging Greenwood Lake and solicit bids.**
- ❑ Implement dredging project in Greenwood Lake.**



# IMPROVING NATURAL RESOURCES AND RECREATION OF GREENWOOD LAKE

- Fisheries Management - Obtain funding and develop a fisheries management plan.
- Boat and Dock Safety Programs
  - Continue distributing “Love your Boat” brochures
  - Seek funding from “I Boat NJ” and New York programs for educational projects
  - Identify other lakes with successful Clean Boats Clean Waters program and create a recommendation report and budget for implementing a similar program on Greenwood Lake.



# REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE

- Reducing Nutrient Loadings from Septic Systems
  - Request that West Milford provide the Commission with status reports on the Septic Ordinance and results from the 604(b) grant
  - Reduce discharges of nutrients from septic systems by encouraging implementation of West Milford's Septic Maintenance ordinance





# REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE

- Storm Water Management
  - Work with Princeton Hydro to complete Storm Water Implementation Plan that identifies and details plan for installing storm water retrofits in West Milford
  - Facilitate memorandums of agreement between West Milford and Passaic County for the purpose of clarifying who is responsible for cleaning and maintaining the storm water retrofits.
  - Improve management of storm water systems



# REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE

- Rehabilitation of Belcher Creek Watershed, including West Milford Lake
  - Reduce discharges of both nitrogen (N) and phosphorus (P), as well as raw sewage, from sewage treatment plants.
  - Improve the capacity of wetlands in the watershed to denitrify, that is to convert nitrate in the water to nitrogen gas in the air. This is done by protecting or restoring the natural functioning of a wetland. Clean up the debris that collects beside streams and lakes.



# REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE

- Rehabilitation of Belcher Creek Watershed, including West Milford Lake
  - Study and address the nutrient pollution coming into and out of Pinecliff Lake and West Milford Lake, even though this pollution is ignored in the “Total Maximum Daily Load (TMDL) for Phosphorus to Address Greenwood Lake” because most of this pollution stays in the lakes.



# REDUCING NUTRIENT LOADINGS INTO GREENWOOD LAKE

## ■ Monitoring

- Monitor on a routine basis in the future the quality of the water leaving Pinecliff Lake and West Milford Lake, as well as that entering Greenwood Lake to measure progress in efforts to restore the waters of the Belcher Creek watershed and Greenwood Lake to less eutrophic conditions.



# FURTHER IMPROVING THE WATER SUPPLY

- Conserving Water Resources
- Planning for Implementation of Highlands Regional Master Plan
- Open Space Acquisition and Preservation
- Community Education

