

Developing Successful Lake Management Plans: Considering All the Elements

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The 3-legged stool of management

The Legs

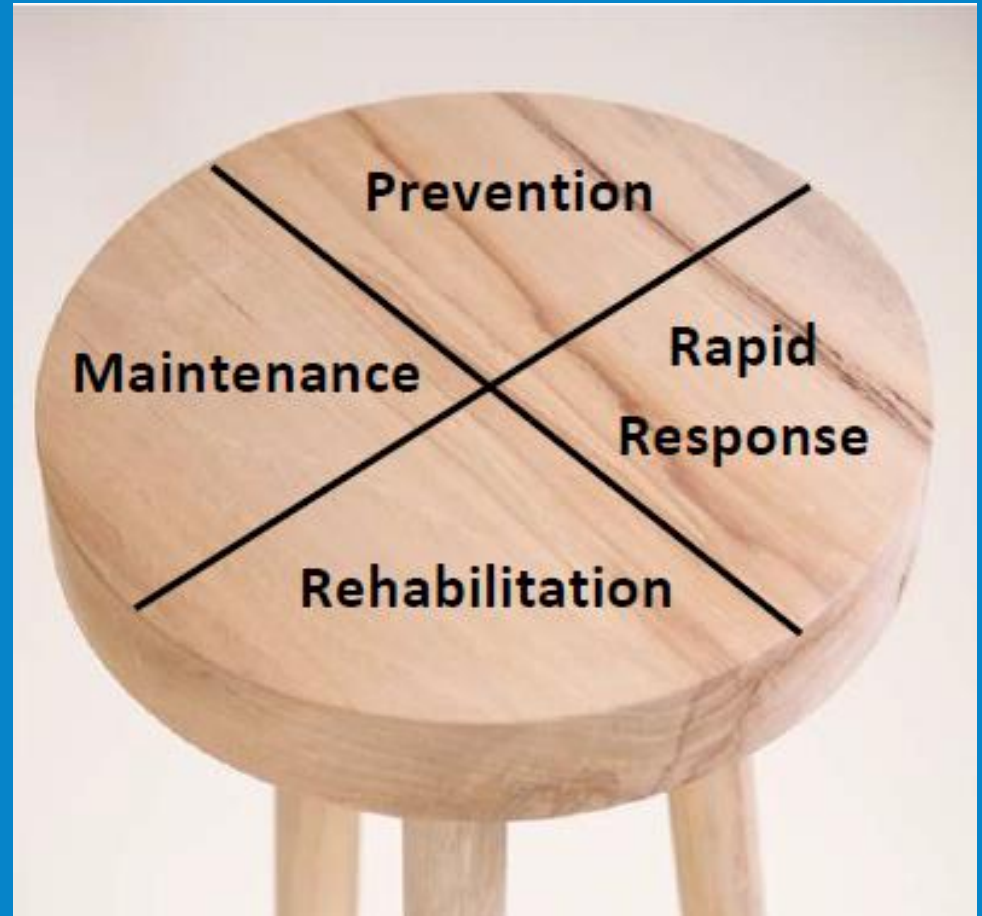
- Technical effectiveness
 - Will it work?
 - Non-target impacts?
- Affordability
 - Cost?
 - Financing?
- Institutional acceptability
 - User acceptance?
 - Regulatory acceptance?



The 3-legged stool of management

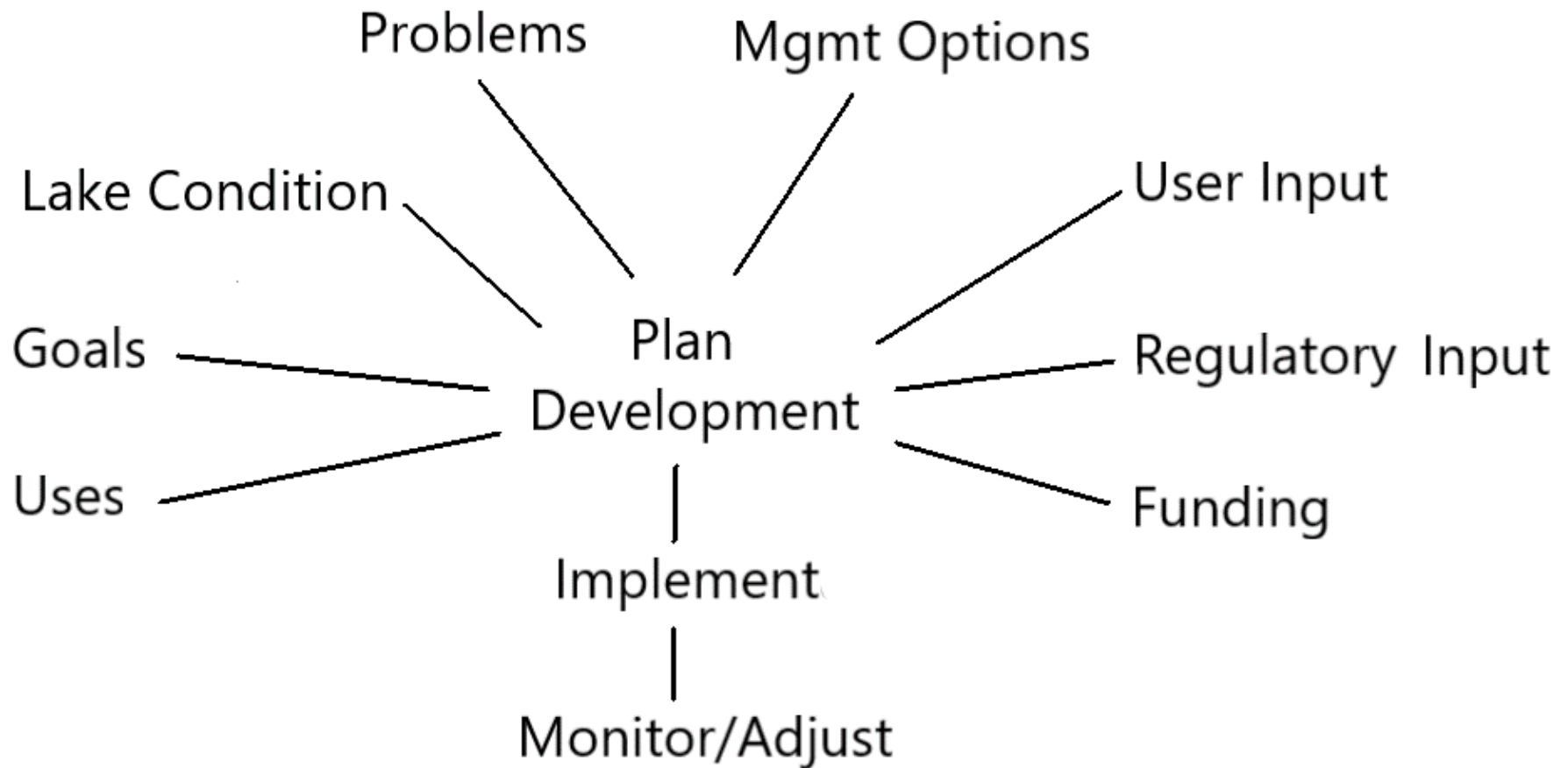
The Seat

- Prevention
- Early detection/
Rapid response
- Rehabilitation
- Maintenance



How big the load is and how it is placed on the seat stresses the legs differently

Planning for lake management in Massachusetts



In what order are these elements addressed?

Watershed vs. In-lake Approaches

- Both have value and are part of holistic lake management
- Watershed management focuses on protection (avoiding problems in the lake)
- Watershed management can rarely counter all effects of urbanization and agriculture
- Watershed management almost never remediates damage to a lake once done
- In-lake actions are almost always necessary to rehabilitate a damaged lake



Planning for lake management in Massachusetts



- Half the area and two thirds the volume of lakes in MA (not counting Quabbin or Wachusett) created by dams
- The presence of an impoundment (lake) changes hydrology and water quality; so do development and agriculture
- A useful analogy for managing lakes is property management (buildings, landscape, related systems); “natural” is an inappropriate condition concept for most lakes in MA

Lake Problems in Massachusetts

- **Algae blooms** – excessive growth by planktonic or benthic forms of algae, especially cyanobacteria, which can be toxic
- **Vascular plants** – excessive growths of any plant, including native species, which impact lake use
- **Invasive species** – plants or animals to which the lake is not adapted that cause economic or ecologic harm (note difference between exotic and invasive species)
- **Sedimentation** – infilling of lakes from soil delivered from the watershed or organic matter generated in the lake

How problems are addressed in Massachusetts



- **Algae – DPH will investigate cyanobacteria blooms and recommend posting a warning if concentrations of potentially toxic forms exceed a threshold**
- **Rooted plants – No**
- **Invasive species – Regulations forbid transport among waterbodies**
- **Sedimentation – Regulations call for erosion control in construction projects**

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The Laurel Lake Example

- 165 acres, 16 m max depth, Great Pond of MA, public boat launch, 2 town beaches (Lee/Lenox), trout stocked, shoreline residences
- Infested with Eurasian watermilfoil (EWM) decades ago, then zebra mussels (ZM) about 2007, detected in 2009
- EWM distribution: common in area lakes, patchy in LL, varies among years
- ZM distribution: only lake in MA with ZM, shore to about 35 feet

The Laurel Lake Example

- Rapid response plan for ZM existed but ignored; panel formed to discuss options, but no actions beyond boat cleaning recommended.
- ZM expand into Housatonic River and into CT, remain a threat to other lakes in Berkshire area.
- LLPA seeks permit for drawdown, narrowly succeeds. Drawdown conducted for 7 years until renewal denied.
- Summary report prepared with recommendation to develop more comprehensive plan with all parties involved. Very limited progress to date.

Laurel Lake Drawdown Summary Report: 2010-2017



Prepared by:
Water Resource Services



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Considerations for Laurel Lake

Uses – swimming, boating, fishing, wildlife habitat, endangered species habitat.

Goals – supporting the above uses, but no written statement or priority established.

Lake Condition – Desirable water quality except for low DO >35 ft in summer and occasional cyanobacterial scums; invasive ZM, multiple invasive plants; endangered snail present; several watershed parcels identified for further evaluation, but no documented major threats.

Considerations for Laurel Lake

Problems – ZM is #1, with impact on uses and ecology in LL, threat to other lakes; EWM also a problem, but less overall impact and already in other lakes.

ZM Mgmt Options – range evaluated, best options include deeper drawdown or molluscicide application, but both have regulatory issues.

EWM Mgmt Options – wide range possible, drawdown successful in water <5-6 ft deep for 7 years, herbicides offer more control.

Considerations for Laurel Lake

User Input – no forum across all user groups; separate meetings enforce narrow minded views. Leadership needed to bring all groups together.

Regulatory Input – fragmented, also no forum for exchange among groups within government. Leadership needed to bring all groups together.

Funding – LLPA, Towns and DCR have funded actions to date; lake is property of the Commonwealth.

Key Questions Regarding Laurel Lake

Is there agreement that ZM infestation is a problem worth managing?

Can ZM eradication be achieved or is it sufficient to maintain population at a low level?

What leeway would a true ecological restoration project have within the regulatory system to cause negative impacts for some time before goals were achieved?

The Need for Planning Groups

- Clearly state goals and priorities
- Identify threats, constraints and opportunities
- Include all parties with an interest
- Balance needs and desires
- Consider all options
- Consider maximum benefit
- Avoid piecemeal evaluation

Questions and Comments

