

Historic and Current Habitat Conditions in Upper Klamath Lake for Endangered Sucker Species

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Upper Klamath Lake around 1900

- Shallow water depth, averaging 8 feet
- Narrow seasonal lake-level fluctuation (2.5 feet)
- Extensive shoreline and upstream wetlands
- Naturally nutrient rich but diversity of algal species



Major habitat changes in UKL since 1900

- Draining of nearshore wetlands**
 - Habitat lost for larval and juvenile rearing, feeding, protection
- Water-quality degradation**
 - All life stages affected by low dissolved oxygen, high pH, blue-green algae blooms, and algal toxins from excessive nutrient enrichment
- Lake elevation fluctuations**
 - Increased magnitude of lake-level fluctuations limits access to lake spawning areas and rearing habitat
- Upstream watershed changes**
 - Chiloquin Dam, stream channel degradation, and nutrient runoff from grazing, timber, and farming activities impact spawning success and lake water quality for all life stages

Critical habitat needs for suckers

Supportive of all life stages:

- Larvae
- Juveniles
- Subadults
- Adults



Supportive of all fish activities:

- Spawning/rearing locations
- Access to food
- Water quality for health
- Predator avoidance



Water-level fluctuation in UKL and habitat changes

- Since completion of Link Dam, seasonal water-level fluctuations have doubled, from 2.5 to 5 feet/year.
- Summer water-level declines for irrigation deliveries reduce feeding, rearing, and protection habitat for larval and juvenile fish.

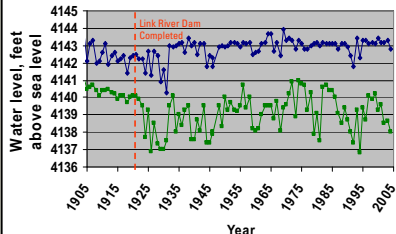
Relatively good shoreline habitat in early summer



Diminished shoreline habitat later in the summer

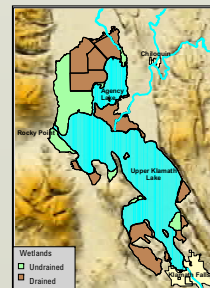
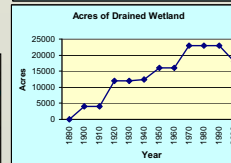
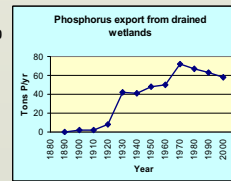


Upper Klamath Lake Water Elevation, (annual maximum and minimum)



Nutrients from drained wetlands around UKL

- Oxidation of soil and up to 8 feet subsidence
- 23,000 acres of wetland drained
- 70 tons P/yr exported to UKL
- Restoration beginning



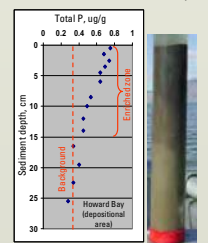
Excessive nutrient loads to UKL have created serious water-quality problems for suckers



Nutrient rich drain water from reclaimed wetlands

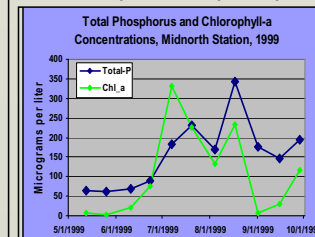
- 100 years of external loads of nutrients have enriched bottom sediments in UKL.
- Internal loading of P from enriched bottom sediments leads to algal blooms.
- Algal blooms raise pH to > 9 and releases toxins.
- Crash of algal blooms lead to zones of low dissolved oxygen.

Phosphorus enrichment of the top 15 cm of UKL (Howard Bay)



Internal loading of P and resultant growth of algae

Near monoculture of AFA in UKL



Large zone of low dissolved oxygen in northern part of UKL, July 2003

