
**FARM AND RECREATIONAL
PONDS AND LAKES**

**AQUATIC PLANTS
&
FISH**

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AQUATIC PLANTS

POND HEALTH

Chemical Recycling

Oxygen Generation

Phytoplankton

Macrophytes

AQUATIC PLANTS

POND HEALTH

Source of Food

Phytoplankton - Zooplankton - Larval Fish

Provides Food for Invertebrate Fish Prey

Foundation of the Ponds Food Web

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POND HEALTH

Habitat for Pond Life Forms

Provides Habitat for Food Invertebrates

Submerged Vegetation

Emergent Vegetation

Floating Vegetation

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POND HEALTH

Habitat for Fish

Protection from Larger Predators

Ambush Site for taking Prey

Detritus for Nest Building

Attachment Substrate for Fish Spawn

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POND HEALTH

Vegetation Imbalance

Plant Deficiency

Reduced Pond Productivity

Reduced Oxygen Input

Plant Overabundance

Prey Fish Become Over Abundant

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POND HEALTH

Vegetation Imbalance

Phytoplankton Overabundance

Shades out desirable macrophytes

Extreme fluctuations in dissolved oxygen

AQUATIC PLANTS

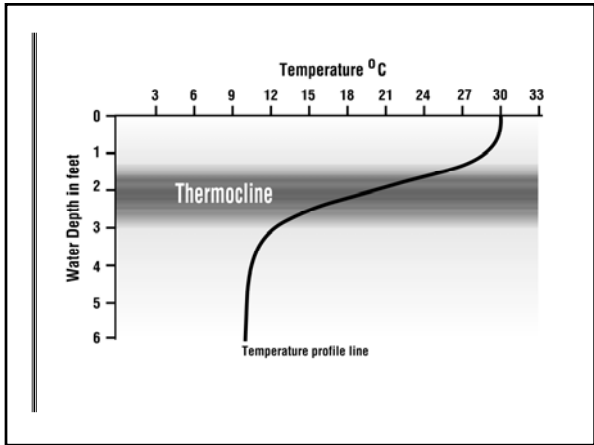
POND HEALTH

Natural Pond Turnover

Seasonal Turnover

Inclement Weather

Diurnal Temperature Change



AQUATIC PLANTS

POND HEALTH

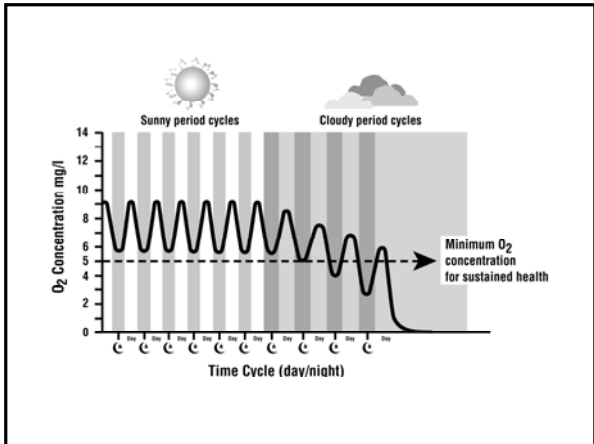
Phytoplankton Crash

Vegetation Die-off

Nutrient Depletion

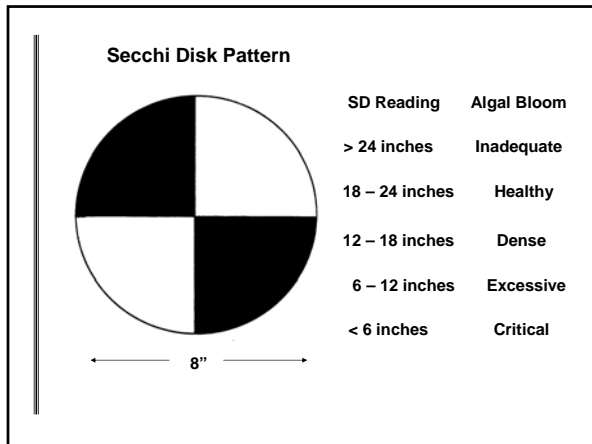
Sudden Temperature Drop

Reduction in light



Secchi Disk Pattern

SD Reading	Algal Bloom
> 24 inches	Inadequate
18 – 24 inches	Healthy
12 – 18 inches	Dense
6 – 12 inches	Excessive
< 6 inches	Critical



Summer Water Temperature Ranges Used To Classify Warm, Cool and Cold Water Ponds

CLASSIFICATION	CONDITION
Warm Water	Summer water temperatures reach 80-90° F and above.
Cool Water	Summer water temperatures reach 70° F, but seldom above 80° F in summer.
Cold Water	Summer water temperatures are seldom above 70° F.

Common Fish Species Found in California Recreational Ponds and Lakes

Species	Survival Range	Optimal Range	Spawning Range
Rainbow Trout	33-78° F	50-60° F	50-55° F
Channel Catfish	33-95° F	70-85° F	72-82° F
Black Bass	33-95° F	55-80° F	60-65° F
Black Crappy	33-80° F	55-80° F	58-64° F
White Crappy	**	**	64-68° F
Bluegill Sunfish	36-93° F	60-80° F	67-80° F
Red-ear Sunfish	***	~ 75° F	72-75° F

Temperatures are general ranges, individual genetic populations may vary.
 ** Similar to black crappie, white crappie are less tolerant to colder water.
 *** Similar to bluegill, but less tolerate to rapid temperature fluctuations.
 ~ Approximately



FARM AND RECREATIONAL PONDS AND LAKES

Stocking Strategies for Recreational Ponds & Lakes

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General classification of relative pond fertility and carrying capacity of non-fed pond biomass expressed in pounds of fish per surface acre of pond

POND CONDITION	CARRYING CAPACITY (lbs. per Surface Acre)
High Fertility	400
Average Fertility	200
Low Fertility	100

Represents ponds receiving no supplemental feed. Smaller ponds of ¼- to ½-surface acre that receive supplemental feed can support a larger fish biomass of about 25 percent. This requires water exchange and attention to water quality and feeding protocol.

Stocking densities for largemouth bass, bluegill and red-ear sunfish in combinations – Based on relative pond fertility, with and without inclusion of channel catfish, and based on 1.0 surface acre of pond

POND FERTILITY	BASS	BLUEGILL	RED EAR	CHANNEL CATFISH
HIGH	150-200			300*
	150-200	1000	-	100
	150-200	700	300	100
AVERAGE	100-125			150*
	100-125	750	-	75
	100-125	525	225	75
LOW	75-100			75*
	75-100	500	-	50
	75-100	350	150	50

* Stocking protocols using bass and channel catfish without a suitable pan fish as forage should be supplemented with a forage minnow.

Traditional stocking strategy for a bass, bluegill, red-ear combination, with and without channel catfish

FISH	STOCKING PERIOD
Bluegill & Red-ear	Spring through mid-November
Largemouth Bass	Spring of the following year
Channel Catfish	Anytime, preferably early spring

Western stocking strategy for bass, bluegill, red-ear, minnow combination stocked in same season, with and without channel catfish

FISH	STOCKING PERIOD
Minnows	Early Spring
Bluegill & Red-ear	One month after stocking minnows
Largemouth Bass	One month following minnows
Channel Catfish	One month following minnows, or before Fall

Combinations of densities for fingerling and adult largemouth bass stocked with fathead minnows, mosquitofish, or golden shiners based on relative pond fertility, and 1.0 surface acre of pond

POND FERTILITY	BASS 4" to 6"	BASS 8" to 10"	Minnows**
High	150 *	100 *	2000 *
	100	50	1500
Average	100 *	75 *	1000 *
	75	35	750
Low	75 *	50 *	1000 *
	50	25	750

* Higher recommendations are presented for areas where predation is a factor.

** Fathead minnows, mosquitofish, golden shiners.

Western stocking strategy for Largemouth bass and minnows

FISH	STOCKING PERIOD
Largemouth Bass	Spring, at the recommended stocking rates provided earlier
Minnows	Spring, at the recommended stocking rates provided earlier

Stocking densities for combination of fingerling and adult largemouth bass and black crappie

FISH	ALTERNATIVE STOCKING DENSITY AND PERIOD
Bass & Crappie	100, 4" to 6" fingerlings, May through September 200, 4" to 5" fingerlings, May through September
Bass & Crappie	50, 8" to 10" juveniles, May through September 25 adults, May through September

Stocking densities for combinations of fingerling and adult largemouth bass and black crappie based on average pond fertility and per 1.0 surface acre of pond

POND FERTILITY	BASS	CRAPPY*
Average	100 4 to 6-inch fingerlings	200 Fingerlings Any Size
Average	50 8 to 10-inch fingerlings	25 Adults

* Not recommended to stock crappie with bass in ponds less than 5-surface acres.

Rainbow Trout Pond Stocking Strategies

Spring Stocking With No Feeding

Stock	RESULT
Stock 500 2 to 4-inch Fingerlings	7 to 8-inch (4 oz) in the First Year
Stock 250 2 to 4-inch Fingerlings	10-inch (8 oz) in the First Year

Spring Stocking With Feeding

Stock	RESULT
Stock 2000 2 to 4-inch Fingerlings	1000 lbs of ½ lb Fish in First Year

Stocking rate of channel catfish in ponds of 1.0 to 10.0 surface acres based on nutrient input, feeding frequency, and incident of predation

NUTRIENT INPUT & FEED	Number of 4 to 6-inch Fingerlings per Surface Acre	
	LOW PREDATION	SIGNIFICANT PREDATION
No Fertilizer; No Feed	100 - 200	300 - 500
Fertilizer Only	200 - 400	300 - 500
Feed Once a Week	200 - 400	300 - 500
Feed 2-3 Times a Week	400 - 600	500 - 700
Feed Daily	600 - 1000	700 - 1000

Higher feeding rates should only be undertaken if the pond is under regular monitoring. Hot summer conditions and/or overfeeding can cause oxygen depletion

Rainbow Trout Stocking Strategy

Stock about 500 trout, 4 to 6 inches in length, per surface acre (most economical)

For catchable-sized trout the first year, the pond stock a maximum of 100 adult fish (7 to 12 inches in length) per surface acre (most expensive)

Trout can be stocked at any time throughout the year, but stocking during cool weather in the fall or spring months will minimize mortality

Ponds can rarely support more than 100 pounds of trout per surface acre without supplementary feeding

