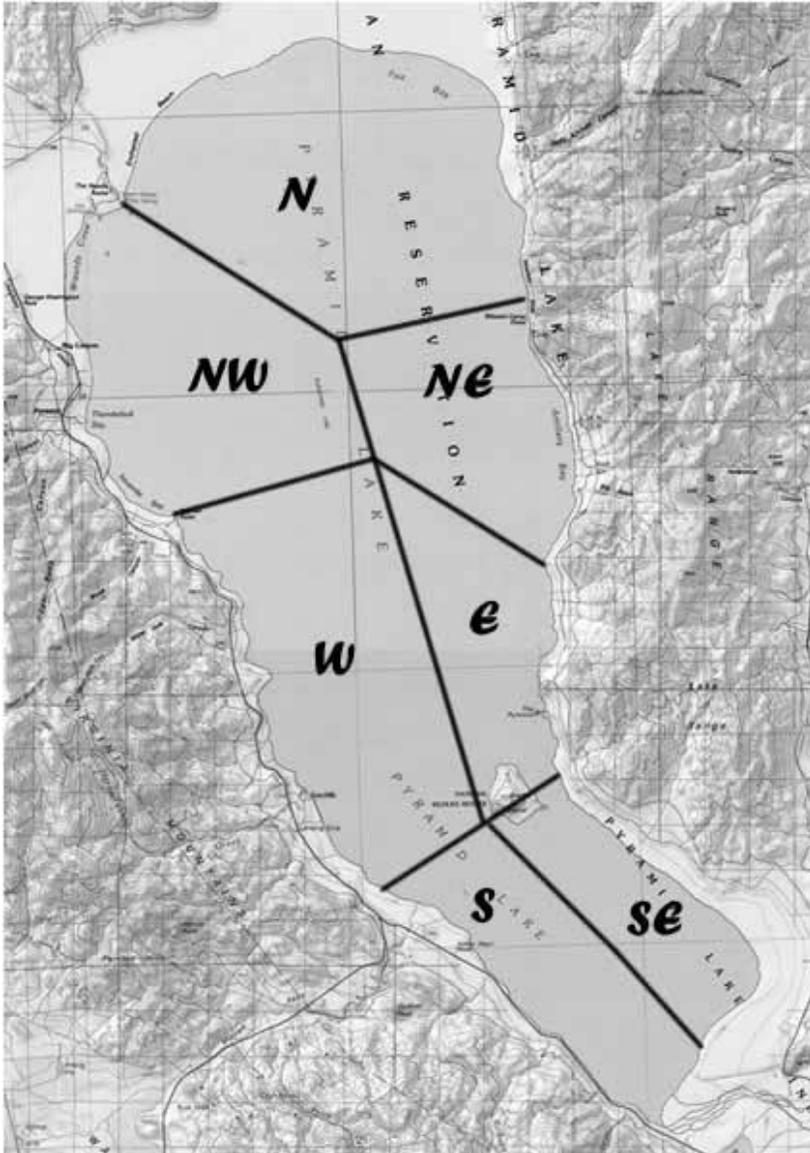


### 3. Pyramid Lake



**Boundaries** Lake shorelines within T23 N – T 27 N and R 20 E – R 23 E.

#### **Ownership**

Pyramid Lake Paiute Tribe; USFWS has jurisdiction over Anaho Island as part of Stillwater NWR.

#### **Focal Species**

All species listed for BMR 93, at least if loose criteria are applied. Significant breeding site for American White Pelican and Double-crested Cormorant. Significant migration stop-over site for waterfowl, waterbirds, and many shorebirds. Significant wintering site for waterfowl and for waterbirds (especially grebes).

### **Type I Habitat**

All open water for waterbirds and waterfowl, except the most central core of the lake (deepest water). Primarily the delta area and south and southeast shoreline for shorebirds.

### **Type II Habitat**

The deepest part of the lake (central area) is sparsely used by focal species. The area should be sampled occasionally, though, to confirm this pattern.

### **Access and Visibility**

From Reno, it takes about a 45-minute drive to get to Pyramid Lake. All ground surveys require day permit, and all boat surveys a boating permit, from Tribe. Access by boat is possible to all parts of the lake, given permission from the Tribe. Access on ground very good on W-shore, E-shore, and delta (S-shore), but sketchy on N and NE-shore (no general public access; special Tribal permit needed). Visibility is excellent. Not much, if any, emergent vegetation present. For big birds, Pyramid Lake lends itself to aerial surveys. Shorebirds can probably be comprehensively assessed in ground surveys.

### **Past and Current Surveys**

Stillwater NWR conducts annual counts of the American White Pelican colony on Anaho Island and estimates its annual productivity. A subset of juveniles is also banded annually by refuge personnel. Christmas Bird Counts conducted since the mid-1990's cover roughly the southern half of the lake. Great Basin Bird Observatory has conducted annual fall migration counts for waterbirds and waterfowl, by boat and from shoreline, since 1998.

### **Potential Survey Methods**

*description* Aerial, boat, and shoreline counts are all very feasible (given permission from Tribe). Colony counts on waterbirds of Anaho Island already in progress but may be expanded to other species (cormorants, gulls). Potential survey methods include area searches that cover part or all of the lake or transect samples by boat (ideally though in cross-sections across the entire lake, since birds often occur in "strata". The whole lake can be area-surveyed in one day by a crew of 8-10 on three boats and a shore crew.

*selection bias* All of the lake is easily visible by air and boat. Most shorelines, but not all, are easily accessible by land (4x4 advised). However, ground surveys by themselves can cover only a minor portion of the available Type I habitat of this big lake, i.e., what's visible from the shore.

#### *measurement error and bias*

Error: Possible problems stem from flushing birds by boat, aircraft, or on foot. Boat surveys and careful ground surveys are best for minimizing this problem. There is little or no cover for observers other than distance, so spotting scopes are definitely needed for ground surveys. High winds are common on this lake, affecting both the ability to launch boats and detectability of birds due to wave action. This site lends itself to testing error of different survey methods.

Bias: High abundances and species richness during migration and winter can lead to possible biases from observer skills. Another potential bias is directional change in water supply affecting shorebird habitat and lake salinity. The Truckee River is highly regulated (dams, reservoirs, diversions) and continued water withdrawal will expose shallows and shorelines and increase salinity, thereby affecting the prey base for several species. However, if regulation changes to allow more water into Pyramid Lake, then shorelines may be flooded and prey communities otherwise altered.

**Pilot Studies Needed**

Enough data may already be available to assess the best survey methods. A comparative study of aerial, boat, and shoreline surveys to investigate may be particularly useful at this site. It would be useful to include a measure of potential habitat related biases, such as flow withdrawal or increase that result in changes to shorebird habitat availability.

**Contacts with Local Knowledge:** Dennis Serdehely, Local Birder; Donna Withers, Stillwater NWR.