

Oregon Coordinated Aquatic Bird Monitoring:  
Description of Important Aquatic Bird Site



**Davis Lake**  
BCS number: 48-9

**Site description author(s)**

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**Site location (UTM)**

Datum: NAD 83, Zone: 10, Easting: 406916 Northing: 4829871

**General description**

“Located about 8 miles east of Willamette Pass in the south-central Oregon Cascades, straddling the Deschutes and Klamath County lines. This lake is unique in the Cascades in being relatively large and shallow, having gentle slope of shore and great fluctuation in water levels providing extensive meadows, cattail marsh, and islands of bullrush.” Approximately 1581 ha (National Audubon Society 2008).

Davis Lake is located just southwest of Wickiup Reservoir (another IWCBM site)

Lake Morphometry

Type: natural lake	Area: 3906 ac (158.0 hect)
Use: recreation, wildlife habitat	Depth: 20 ft (6.1 m) MAX 9 ft (2.8m)
Location: T 22S, R 7E section 27	Ave/Max Depth Ratio: 0.46
Coordinates: 43deg 38min 04sec North	Volume 35940 acre ft (44.316 cu hm)
Latitude: 43.616 Longitude: -121.8464	Shoal Area: 50%
USGS Quad: Hamner Butte & Davis Mtn-121deg 49min 41sec West	Volume Factor: 1.38
Elevation: 4386 feet (1336.9 meters)	Shape Factor: 1.6
Drainage Basin: 111 sq mi	Length of Shoreline: 13.5 mi (21.7 km)
Trophic Status: mesotrophic – growth of algae stimulated by recycled bottom sediments.	Retention time: 4 months

*Notes: Area determined from air photo, source – Oregon National Guard, 1981-82.*

Davis Lake is newer lake, a product of the relatively recent lava flows that blocked Odell Creek channel approximately 1,000 years ago. The lake is younger than 6,600 years, as it is not covered with the regional fall-out from the eruption of Mount Mazama.

The drainage basin covers an area of about 111 square miles and reaches a maximum elevation of 8744 feet at the summit of Diamond Peak. The lava plateau slopes gently toward the northeast and is dotted with many cinder cones. A surface deposit of highly permeable pumice overlies all but the most recent deposits and supports an almost continuous forest of ponderosa pine. Infiltration rates into the permeable volcanic material are very high and little surface drainage has developed. Thus, the hydrologic boundary of the basin may not be completely coincident with the topographic basin.

Davis Lake is rich biologically; the bottom material has a high organic content and the production of insects, crustaceans, and other fish food is high. It is well enriched from natural sources (McHugh 1972). As the waters in the lake recede, exposing more wetland, a variety of emergent macrophytes grow in the shallow areas. Grasses surround the lake, and small birds nest in the grasses and willows. Waterfowl habitat is excellent and supports a variety of ducks, geese, swans and Sandhill cranes. Davis Lake is an important link in the chain of waterways and feeding ground that form a major migration route.

Much of the ecological character of Davis Lake is determined by its shallow morphometry and fluctuating water level. It is constantly mixed from top to bottom and does not develop any stable thermal stratification. Dissolved oxygen is always plentiful throughout the water column. Major ion concentrations are slightly above average for natural mountain lakes in the Cascades, but are characteristic of lakes in the Cascades surrounded by pumice soils. The concentration of chlorophyll and phosphorus and the water transparency suggest mesotrophic conditions. Nutrients are readily recycled from the rich organic sediments and stimulate the growth of planktonic algae, also a consequence of the continual mixing of the water column. Additional nutrients are added by migrating waterfowl. The phytoplankton densities reflect mesotrophy; however the species present indicate varying ecological conditions. Anabaena is more common in eutrophic lakes, while Chromulina is most often found in oligotrophic lakes. The phytoplankton also contains many periphytic diatoms (diatoms growing attached to macrophytes on the lake bottom), which are characteristic of shallow lakes.

Fishing in Davis Lake is excellent. Only fly-fishing is now permitted, thereby reducing pressure on the lake and providing for a quality experience. Baits and lures can be used on Odell Creek. The creek is closed to fishing until the end of May because of spawning rainbow trout. Rainbow trout, some quite large, are taken most commonly in the lake, kokanee also run large, but appear to have declined in numbers in recent years. Landlocked coho salmon are generally self-sustaining, although they have been restocked periodically. The lake was treated in 1961 to kill unwanted fish. Toxaphene was used and because of the persistence of the toxicant, nearly a year passed before restocking was possible. No trace of toxaphene was ever detected in the springs entering Wickiup Reservoir (McHugh 1972). Restocking was with Atlantic salmon, kokanee, and silver salmon. Oregon whitefish are also found.

## **Boundaries and ownership**

*Boundaries:* Davis Lake is one of the largest of the many mountain lakes on the east slope of the Central Oregon Cascades. It straddles the Klamath/Deschutes county line and lies at an elevation of 4,386 feet. The lake and the mountain on its eastern border were presumably named after “Button” Davis, a Prineville cattleman who ran his stock in this vicinity. In 1878, Lt. T.W. Symon’s survey report used the name Davis Lake in his description of the lake and its valley and pointed out several essential features: the large surrounding meadow, backed by a forest of ponderosa pine; evidence of large fluctuations in water level and surface area; and the lava dam that impounded the waters from Odell Creek to form the shallow lake.

*Ownership:* USDA Forest Service (National Audubon Society 2008). See also Figure 2 for BLM Prineville District ownership map.

## **Water levels**

Odell Creek and Ranger Creek, two perennial streams, feed the lake and there is direct surface runoff from snow melt. Subsurface springs must also contribute to inflow. There is no surface outlet, but considerable seepage through the blocky lava dam. During the summer season this output exceeds flow into the lake and the surface area covered by water gradually decreases. High water level usually occurs in June with a two or three foot drop by autumn and considerable reduction in surface area. There is also fluctuation from year-to-year in response to the amount of precipitation in the preceding winter, and to some extent in the two or three previous years. It is not unusual for surface area to vary from 1000 acres to 4000 acres in successive years. Davis Lake is more meadow and marsh than it is lake in drier years. The normal range of water surface elevation in historic times appears to about from about 4376 feet to a high of 4392 feet. Klamath and Deschutes counties and the ODFW combined efforts to seal several sumps along the east side of the lake to reduce water loss (McHugh 1972). Other sumps are known to exist in the bottom of the lake, and water loss through these is the reason no attempt has been made to raise the lake level for storage, as has been done with many other lakes in the area.

Four miles downstream from the lake at the far end of the lava flow is Davis Creek, fed by a number of large springs whose openings range in elevation from 4310 feet to 4360 feet. Since the construction of Wickiup Dam in 1949, located 10 miles northeast of Davis Lake, these springs are usually submerged except when water level in the reservoir is low. However, this does not appear to influence the flow of these springs. Although the source of this spring flow has not been directly traced, it appears that they are in large part supplied by seepage from Davis Lake. There is a well defined relationship between the flow of the springs and the stage of the lake.

## **Focal species use of the site**

“Davis Lake is an important Cascades breeding site for hundreds of Western and Eared Grebes, and hosts thousands of grebes, coots, and waterfowl in migratory and winter seasons (when the lake is not frozen). In addition, the lake, marshes, and adjacent forest (burned and unburned) host a great variety of bird species, especially during migration and breeding seasons. Bald Eagle is a permanent resident. Up to two pairs of

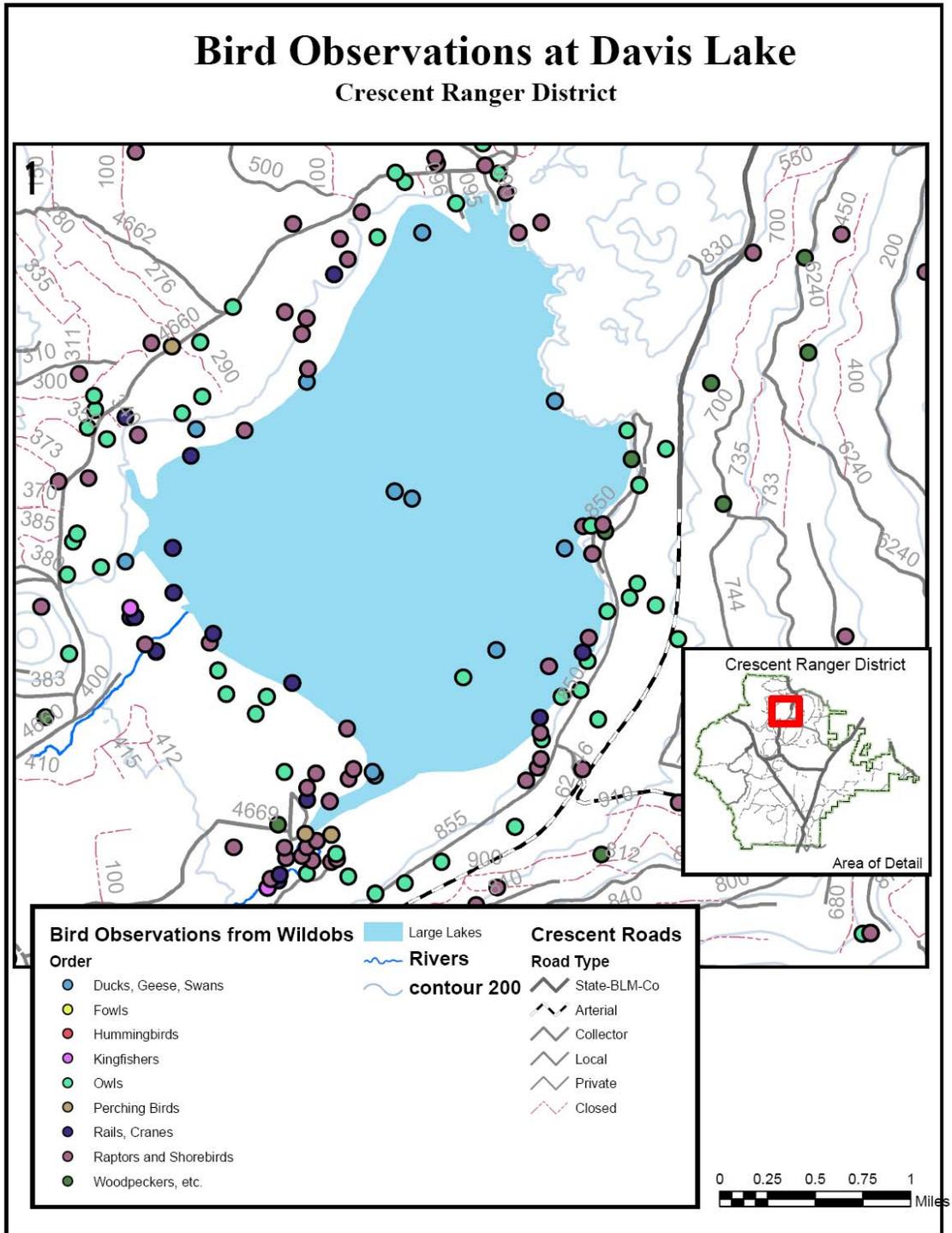
Sandhill Cranes typically nest. Dozens of Wilson's Phalaropes nest. Many species of ducks breed, including Ruddy Duck, Wood Duck, Blue-winged Teal, Green-winged Teal, Redhead, Ring-necked Duck, Bufflehead, Barrow's Goldeneye, Hooded Merganser, and probably Canvasback and Lesser Scaup” (National Audubon Society 2008).

**Focal Species Use and Timing**

<b>Focal Guild/Species</b>	<b>Wintering</b>	<b>Breeding</b>	<b>Migration</b>
Secretive Marsh Birds*			
Colonial Nesting Waterbirds		Present	
Ground-based Aquatic Birds			
Migrating Shorebirds		Present	
American White Pelican			
Barrow’s Goldeneye			
Black-necked Stilt			
Bufflehead			
Dusky Canada Goose			
Franklin’s Gull			
Greater Sandhill Crane		Present	
Long-billed Curlew			
Snowy Egret			
Red-Necked Grebe			
Upland Sandpiper			
Western Snowy Plover			
Yellow Rail			

\*The focal species for Oregon’s secretive marsh bird monitoring are PBGR, LEBI, AMBI, VIRA, SORA, YERA.

Figure 1: Bird Observations at Davis Lake



**Location and use of Type 1 and Type 2 habitats within site**

Water / Open water / Lake / Wetlands / Emergent Herbaceous Wetlands (National Audubon Society 2008)

<b>Functional Group</b>	<b>Type 1 Habitat</b>	<b>Type 2 Habitat</b>

\*See Google Earth (2008) map with the USFWS National Wetlands Inventory (2008) layer.

**Access to Type 1 and Type 2 habitats**

“Road access to the lake's northeast shore and Lava Campground is closed in spring and early summer to protect vulnerable wildlife. The entire area is inaccessible in winter due to snow” (Deschutes & Ochoco National Forests).

**Audibility/visibility of focal species**

**Conservation issues**

**Past and current surveys**

**Potential survey methods**

Manning and Hartley (2006) suggest that a ground-based survey for all aquatic birds would be valuable, and might be able to be conducted by volunteers. A survey of breeding colonies would also be valuable, and would probably need to be conducted by staff. It also needs to be determined whether aerial surveys for waterfowl would be beneficial.

**Potential pilot studies**

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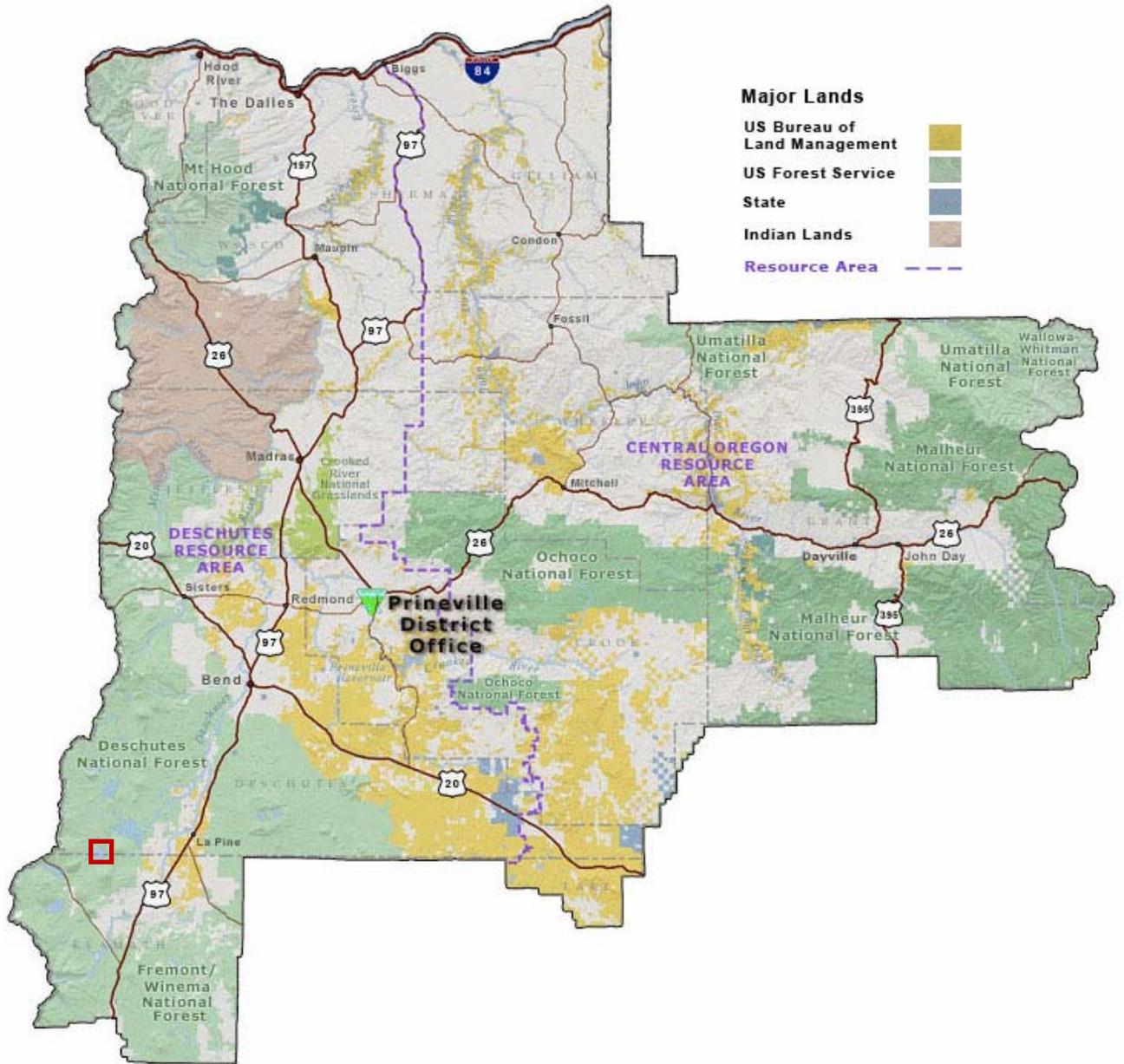
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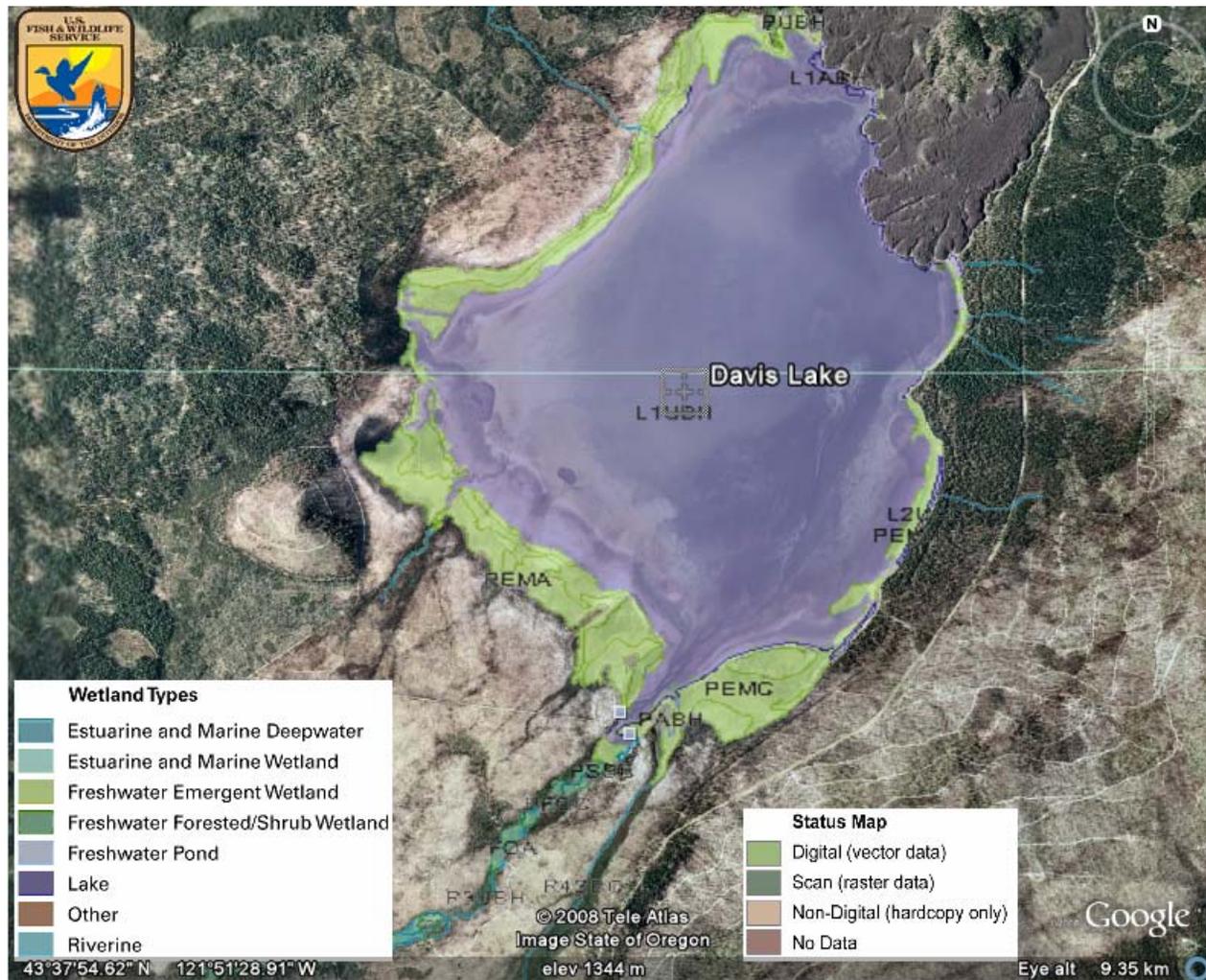
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**Figure 2:** BLM Prineville District ownership map. The red box indicates Davis Lake.



**Figure 3:** Google Earth (2008) map of Davis Lake with the USFWS National Wetlands Inventory (2008) layer.



**Figure 4:** Google Map (2009) road view of Davis Lake.

