

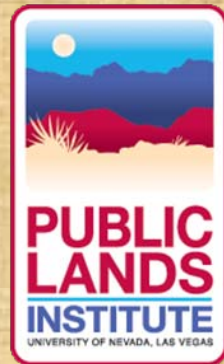
Inventory and Temporal Variation of Aquatic Birds Using Lakes Mead and Mohave



Joe Barnes and Jef Jaeger

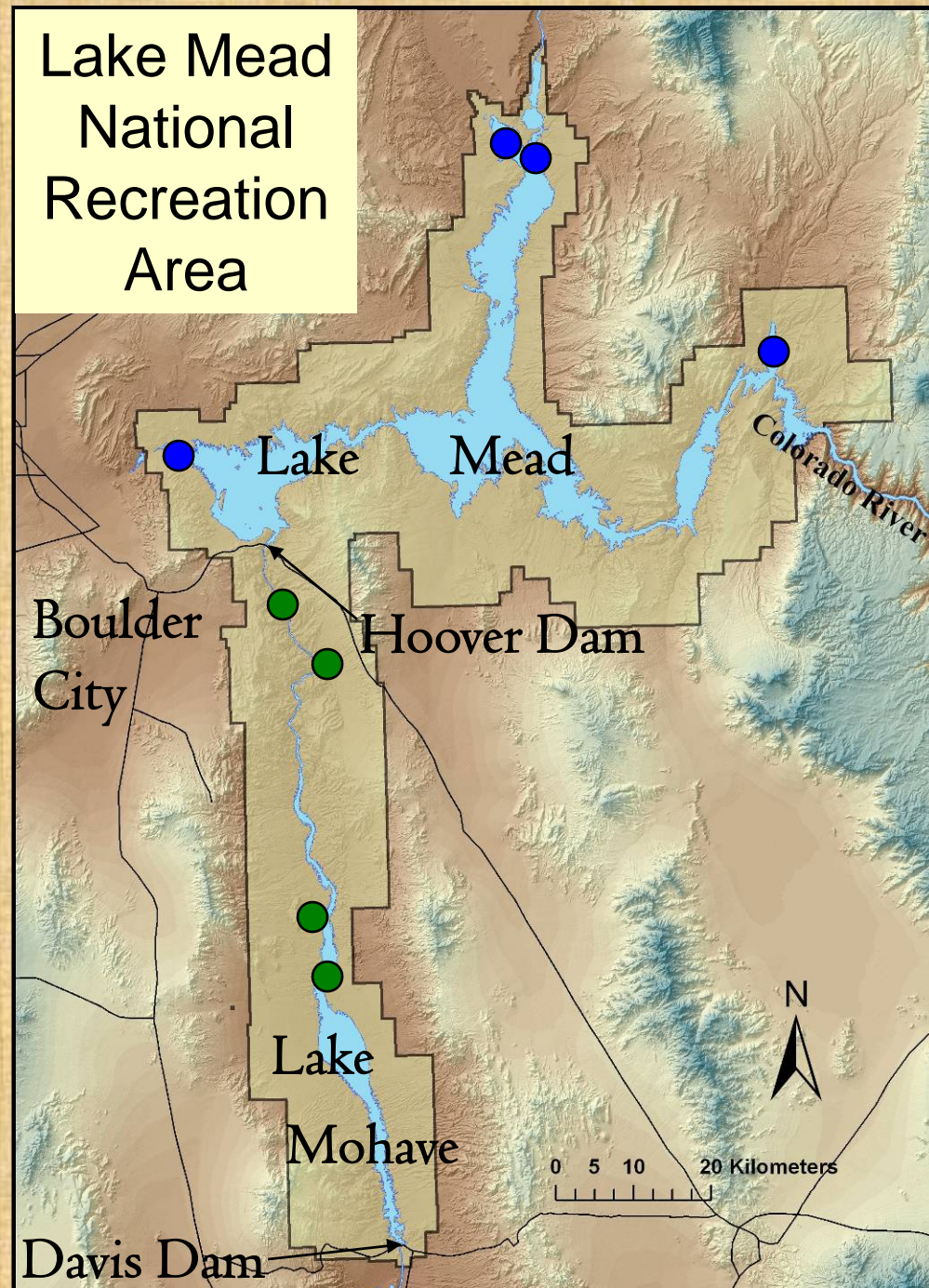
Public Lands Institute and School of Life Sciences, University of Nevada, Las Vegas

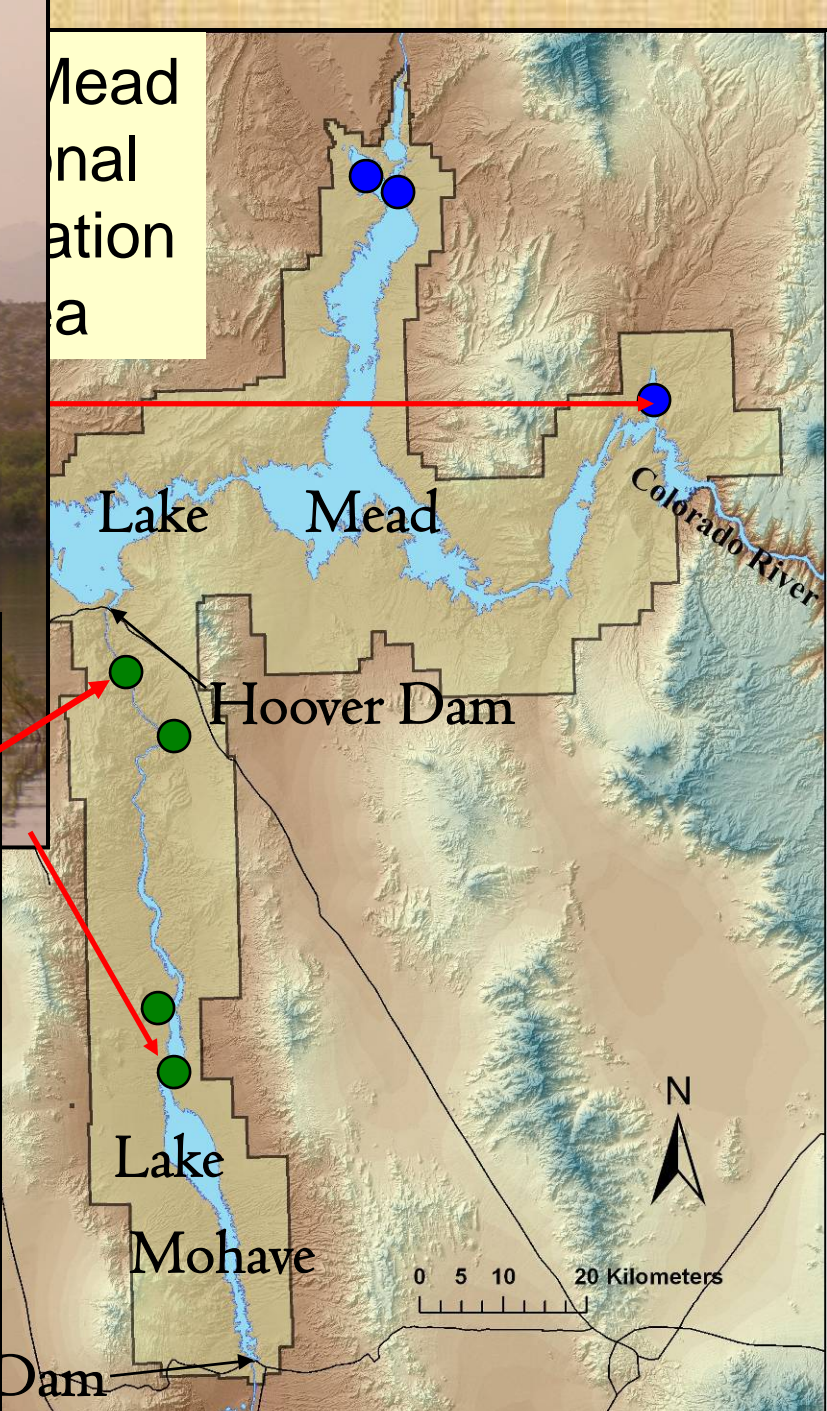
Under Task Agreement with Lake Mead National Recreation Area



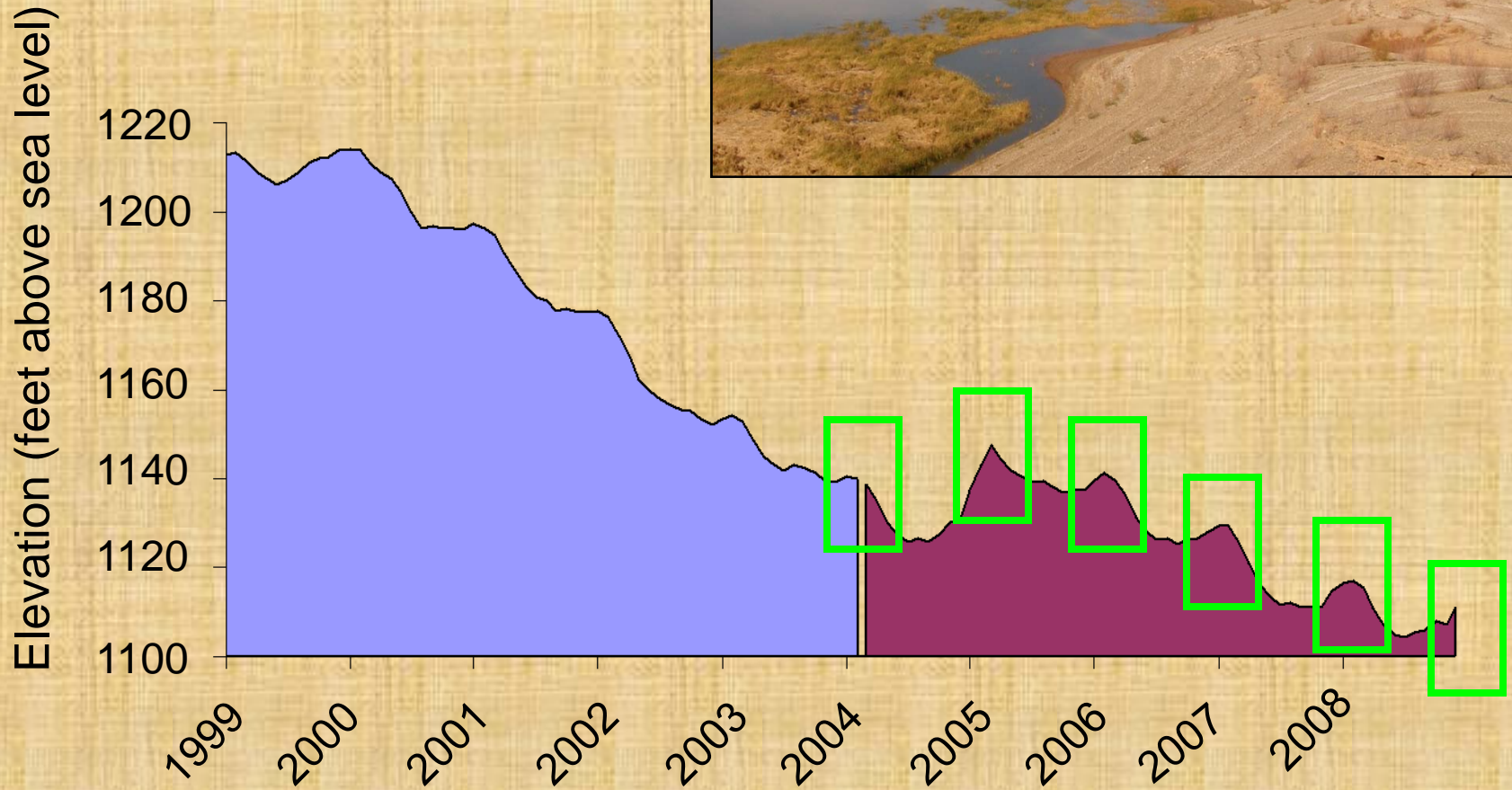
Aquatic Bird Monitoring Program

- Survey period: March 2004 – December 2008
- Monthly monitoring of 8 sites*
- Areas of high aquatic bird concentration selected for monitoring
- Survey shoreline by boat or on foot
- Tally all aquatic birds and raptors on shoreline, in open water, and in air within survey area





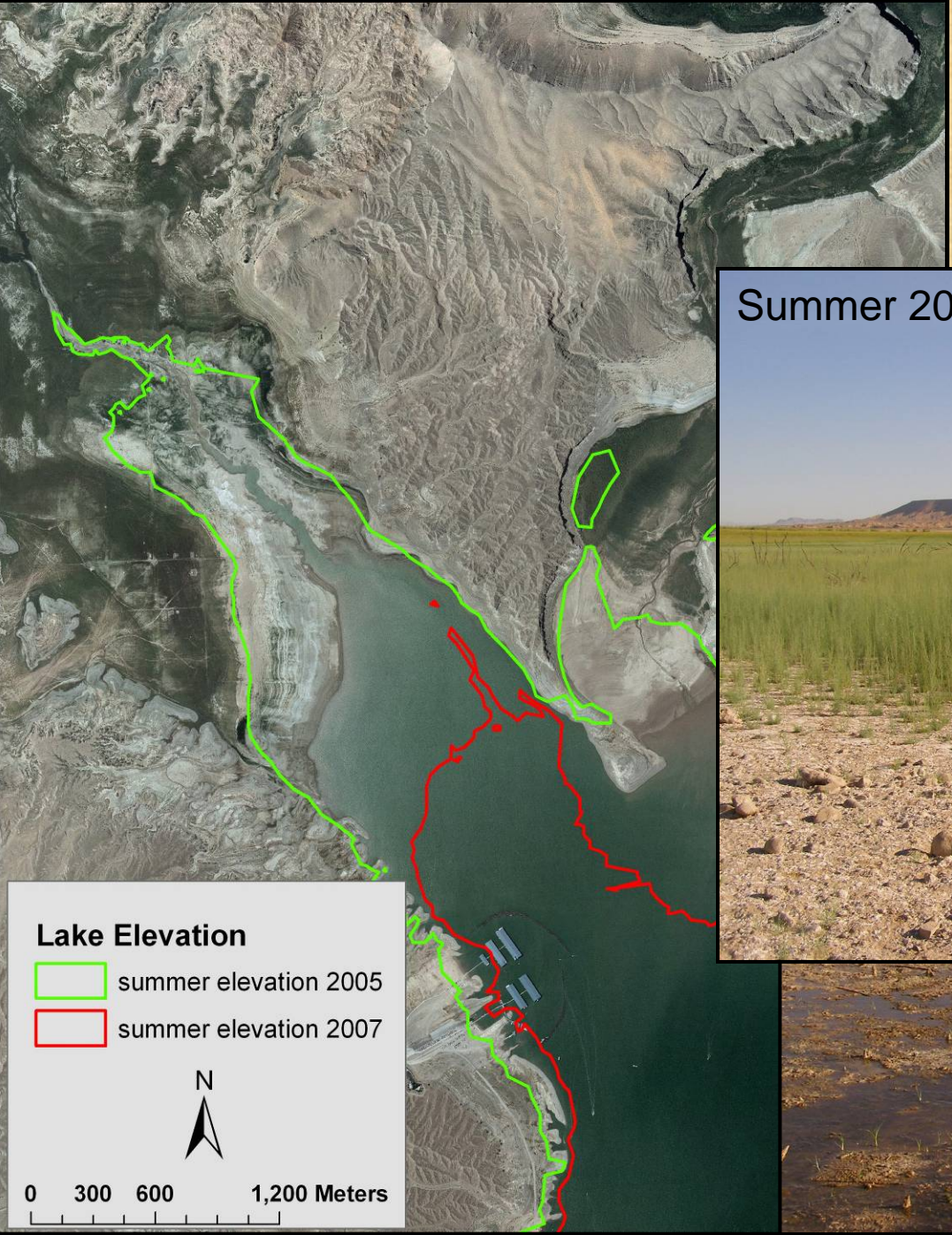
Lake Mead Water Level: 1999-2008



Early 2005



Summer 2007



Lake Elevation
summer elevation 2005
summer elevation 2007



0 300 600 1,200 Meters



2005



Spring 2007

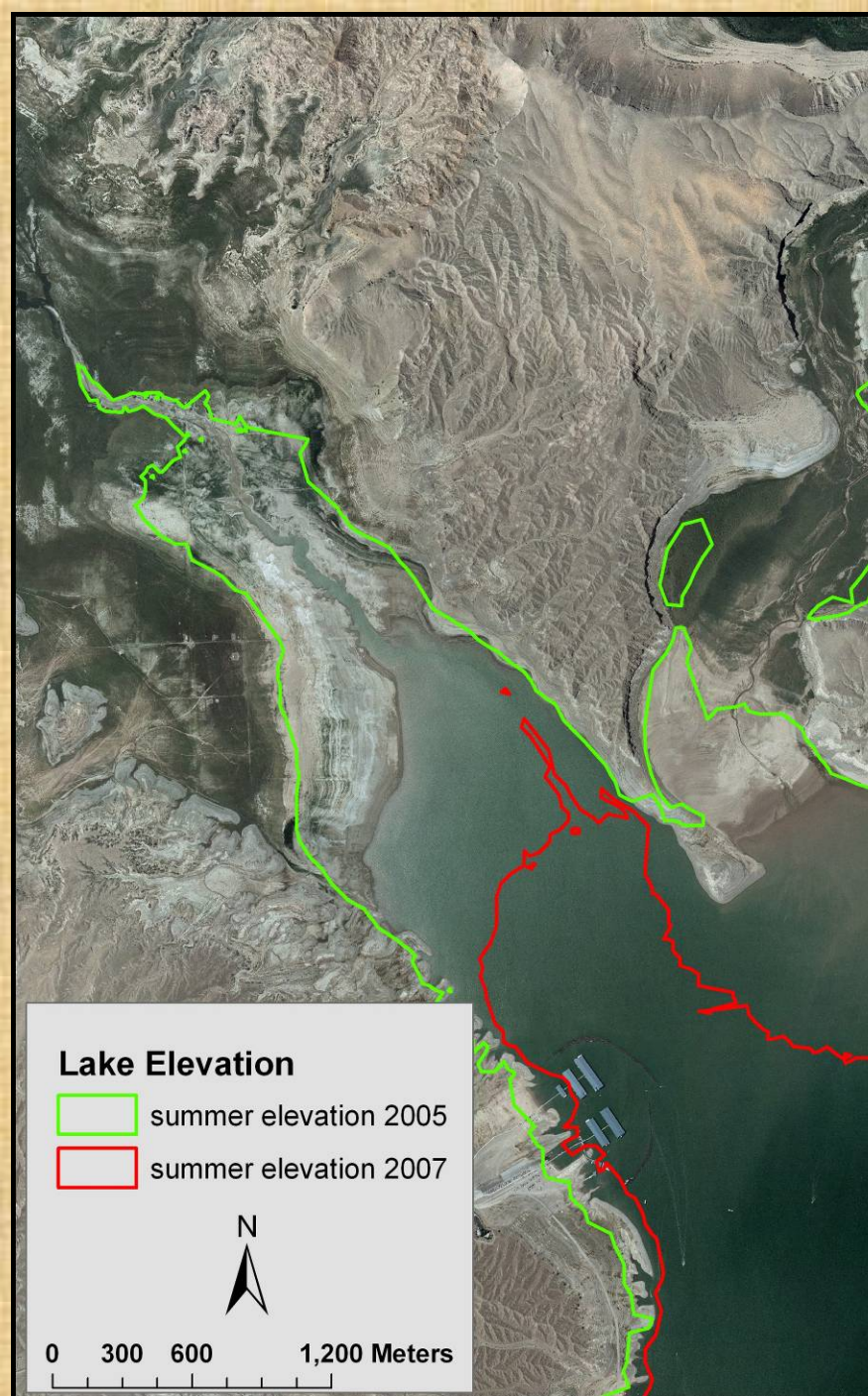


Lake Elevation

-  summer elevation 2005
-  summer elevation 2007



0 300 600 1,200 Meters



Monitoring Results: March 2004 – December 2008



Lake Mead

- 3 regular sites*
- 168 surveys conducted
- 105 species documented
- 116,851 birds tallied
- 695.5 birds/survey

Lake Mohave

- 4 regular sites*
- 189 surveys conducted
- 69 species documented
- 34,947 birds tallied
- 184.9 birds/survey

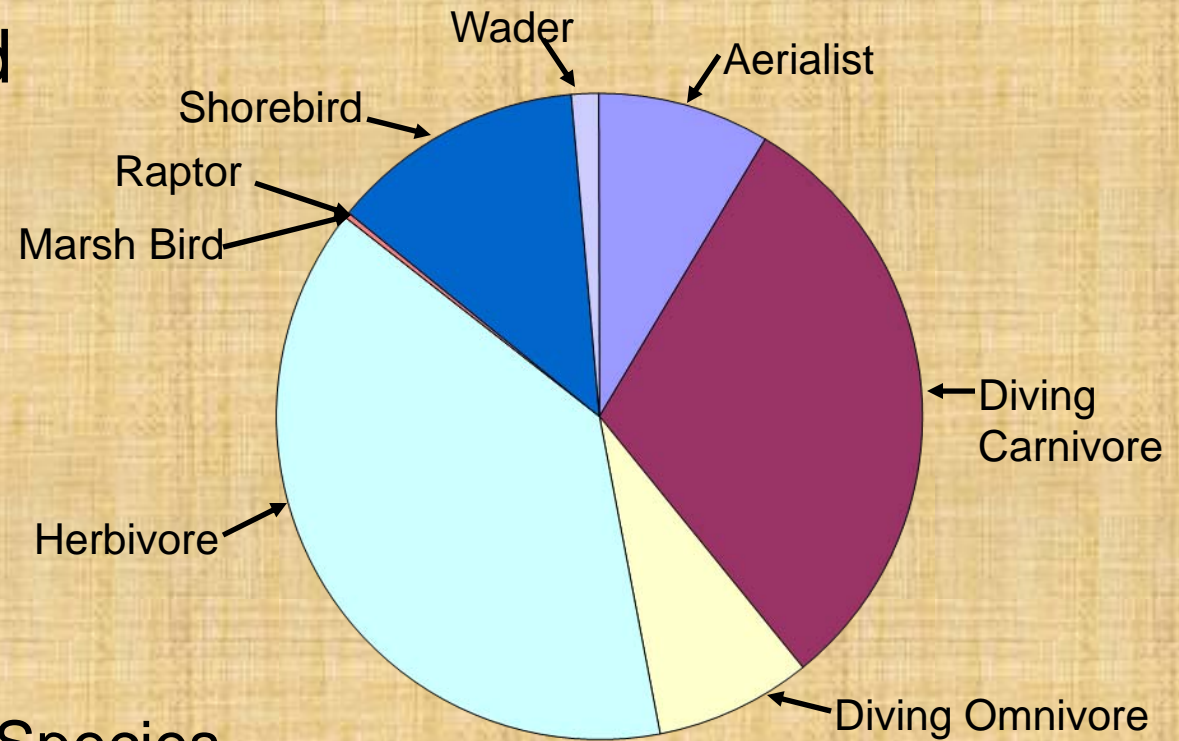
Incidental Counts

- Lake Mead: 29,051 birds
- Lake Mohave: 15,093 birds

Foraging Guilds: Number of Species

Guild Name		Lake Mead	Lake Mohave	Lake Mead NRA
Aerialist	Gulls, Terns, and Kingfishers	12	8	12
Diving Carnivore	Grebes, Loons, Cormorants, Pelicans, and Mergansers	13	14	15
Diving Omnivore	Diving Ducks (Ruddy Ducks, Scaups, Redheads, etc.)	10	10	12
Herbivore	Coots, Dabbling Ducks (Mallards, Wigeons, etc.), and Geese	17	10	17
Marsh Bird	Soras, and Rails	5	1	5
Raptor	Bald Eagles, Osprey, Hawks, Owls, etc.	15	13	17
Shorebird	Sandpipers, Plovers, Ibis, etc.	26	8	26
Wader	Hérons, and Egrets	7	5	7
Totals		105	69	111

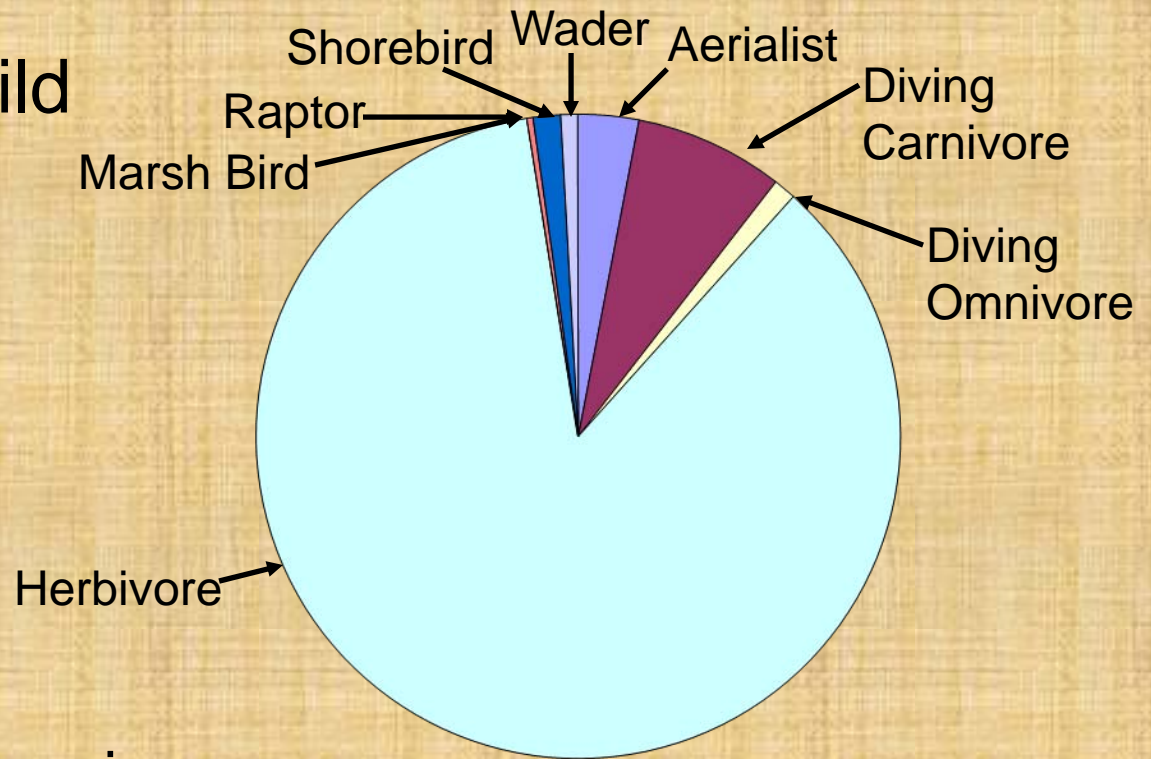
Lake Mead: Guild Composition



Five Most Abundant Species

Species	Guild	Total	% of Total
Clark's/Western Grebe	DC	21,830	18.9
American Coot	H	20,651	17.7
Green-winged Teal	H	7,753	6.6
Ruddy Duck	DO	7,091	6.1
Least/Western Sandpiper	SB	5,602	4.8
Total		62,927	53.8

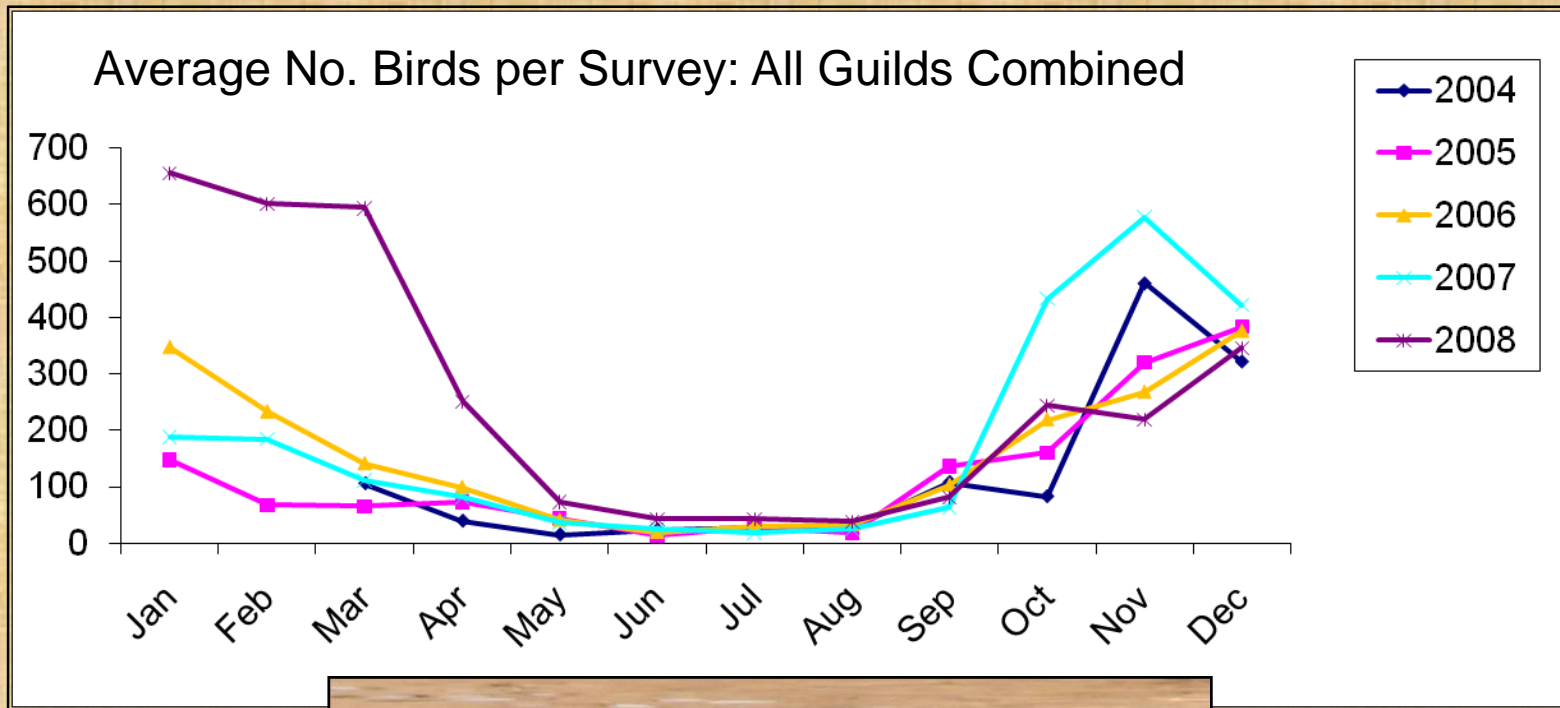
Lake Mohave: Guild Composition



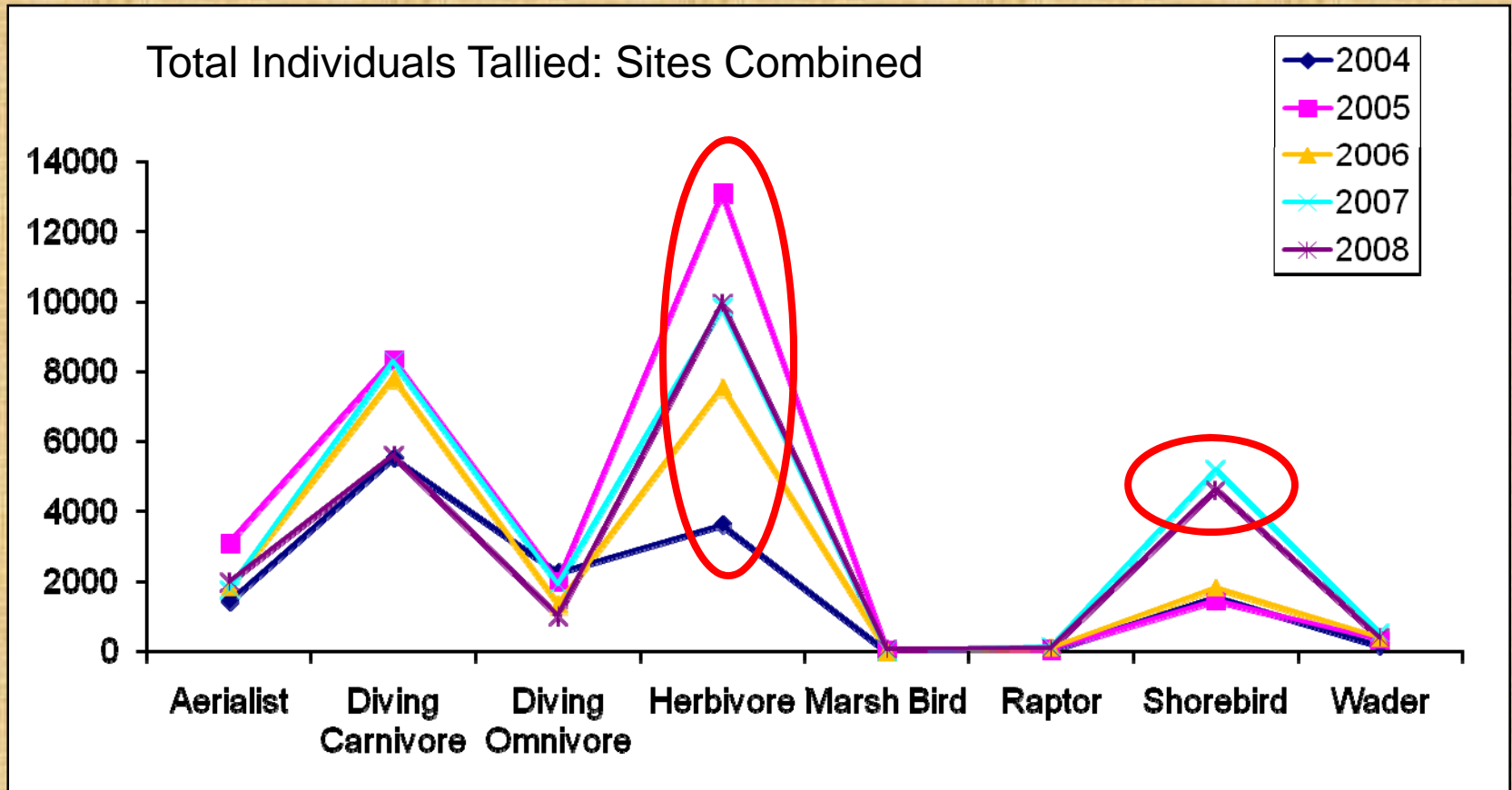
Five Most Abundant Species

Species	Guild	Total	% of Total
American Coot	H	28,603	81.8
Double-crested Cormorant	DC	1,404	4.0
Mallard	H	1,157	3.3
Ring-billed Gull	A	859	2.5
Common Merganser	DC	339	1.0
Total		32,362	92.6

Lake Mohave Annual Distribution



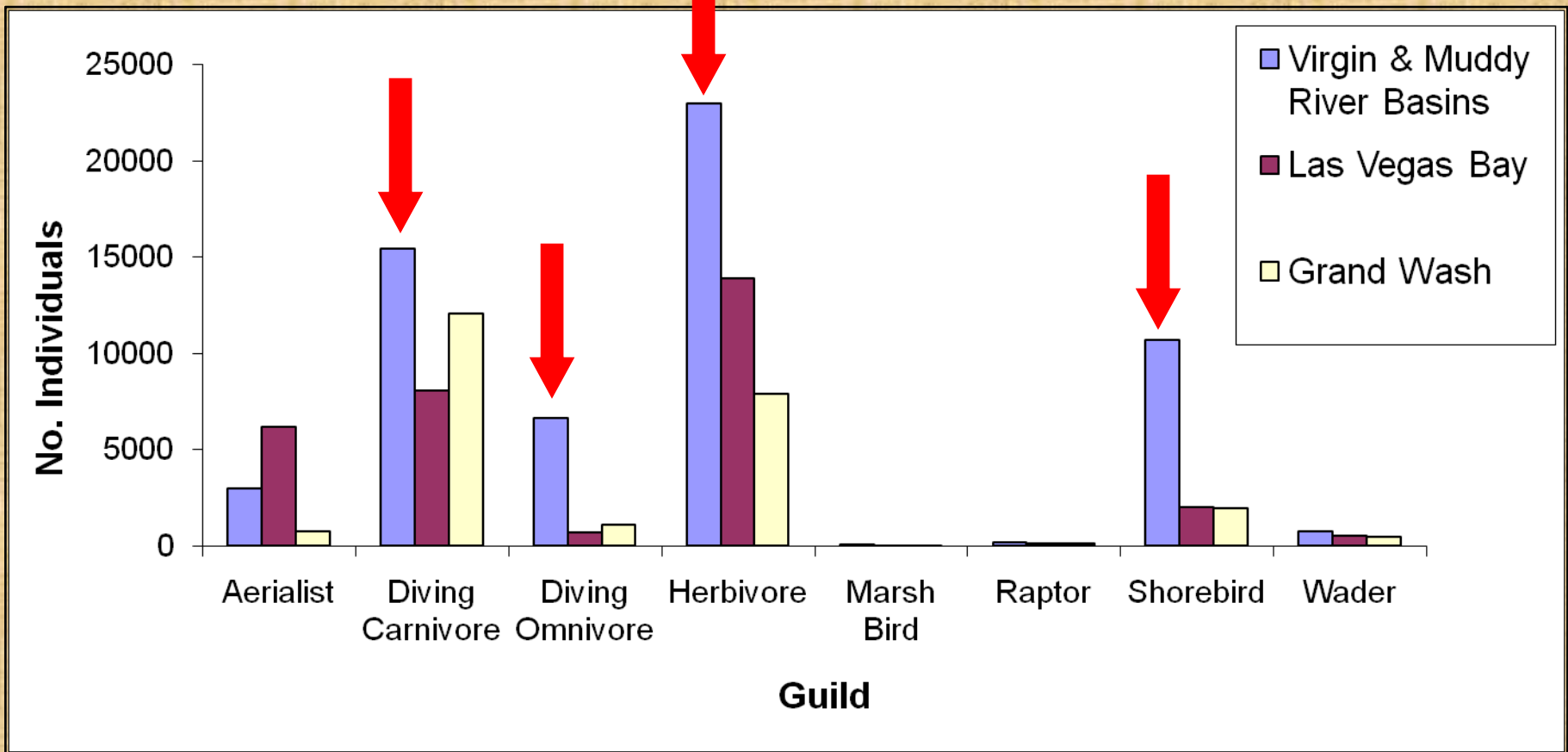
Lake Mead: Guild Totals by Year



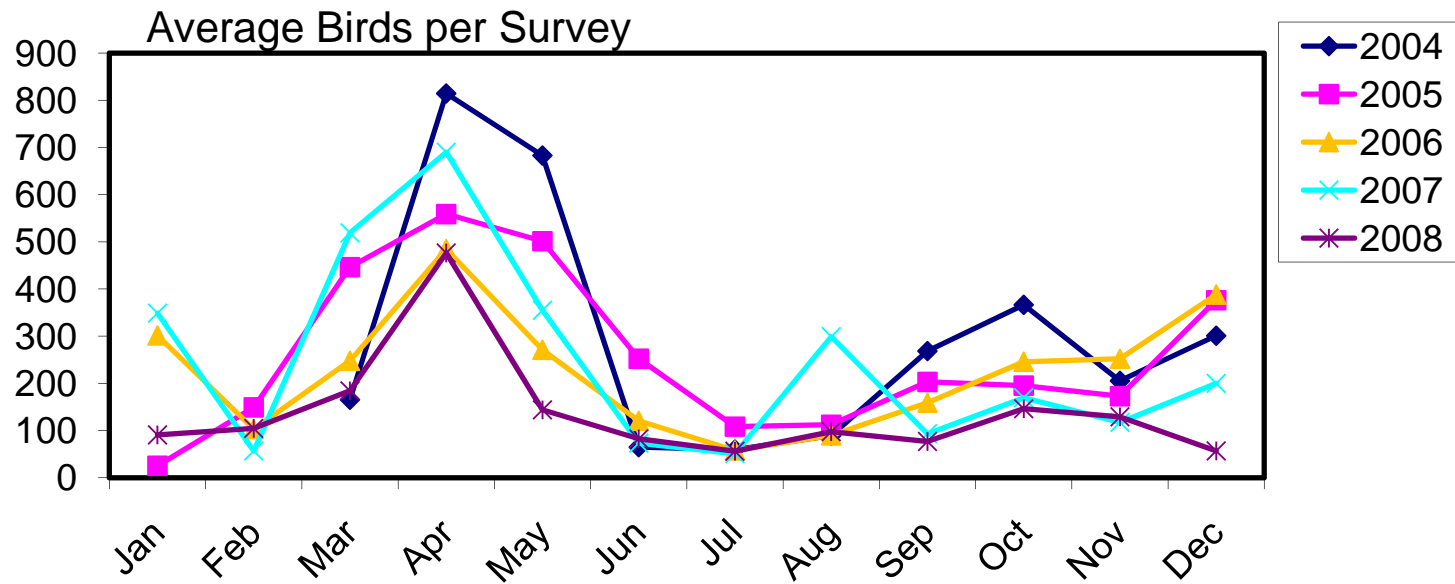
Lake Mead Distribution by Site



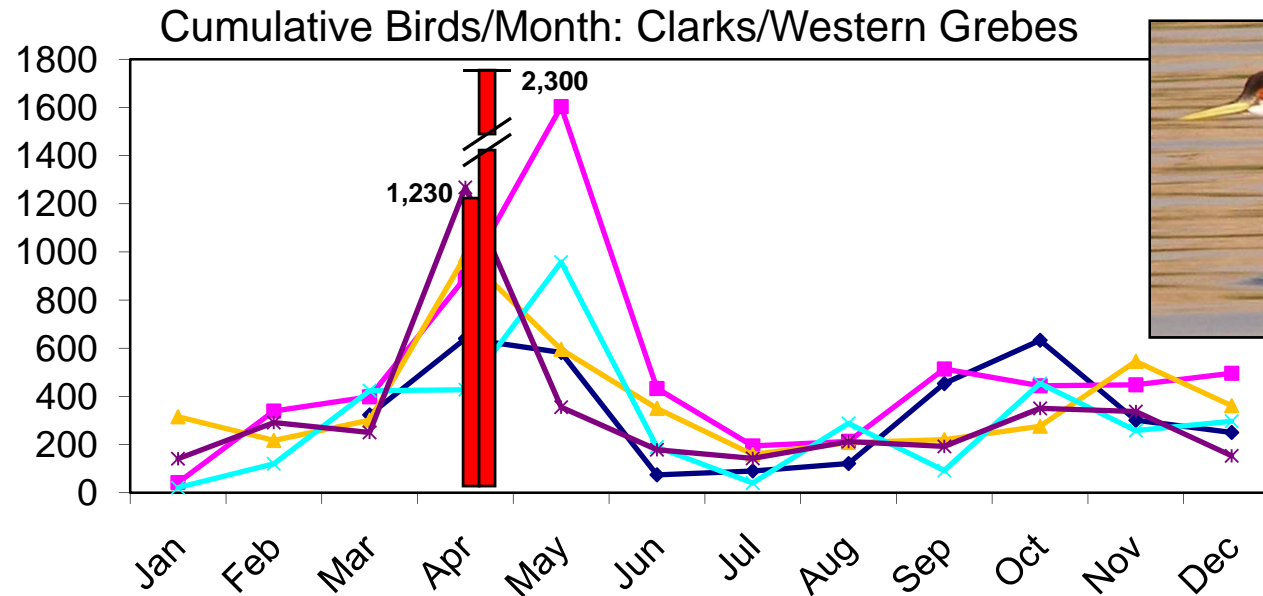
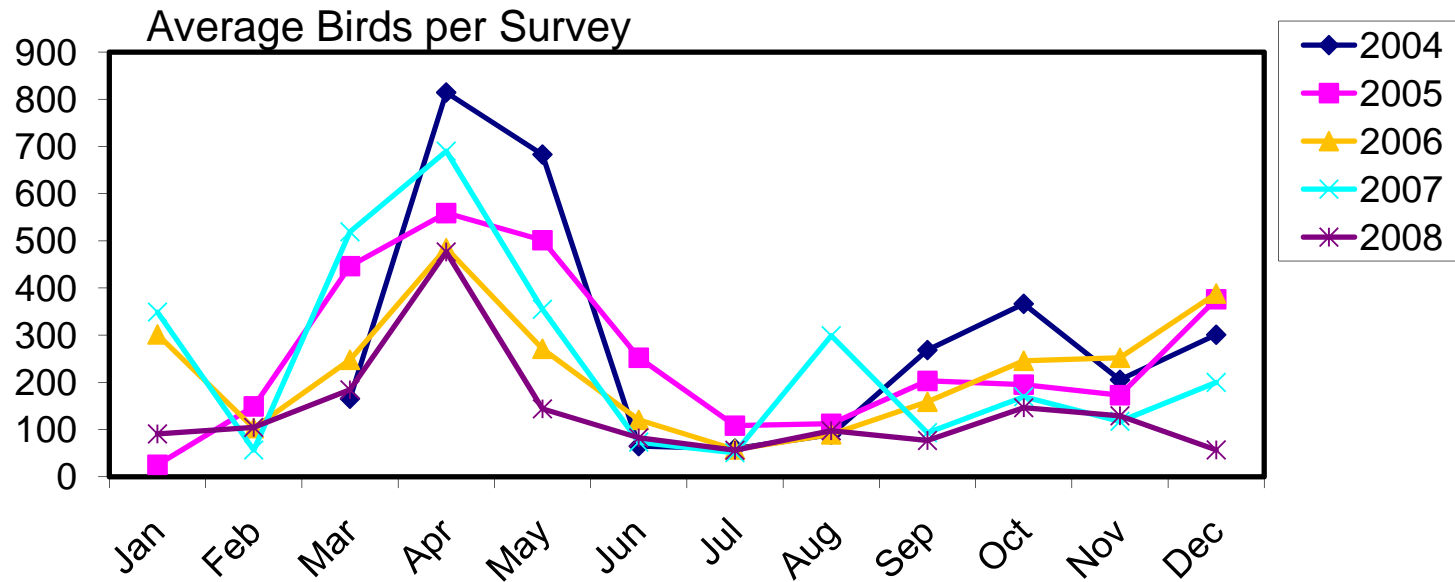
Total Number of Birds by Guild



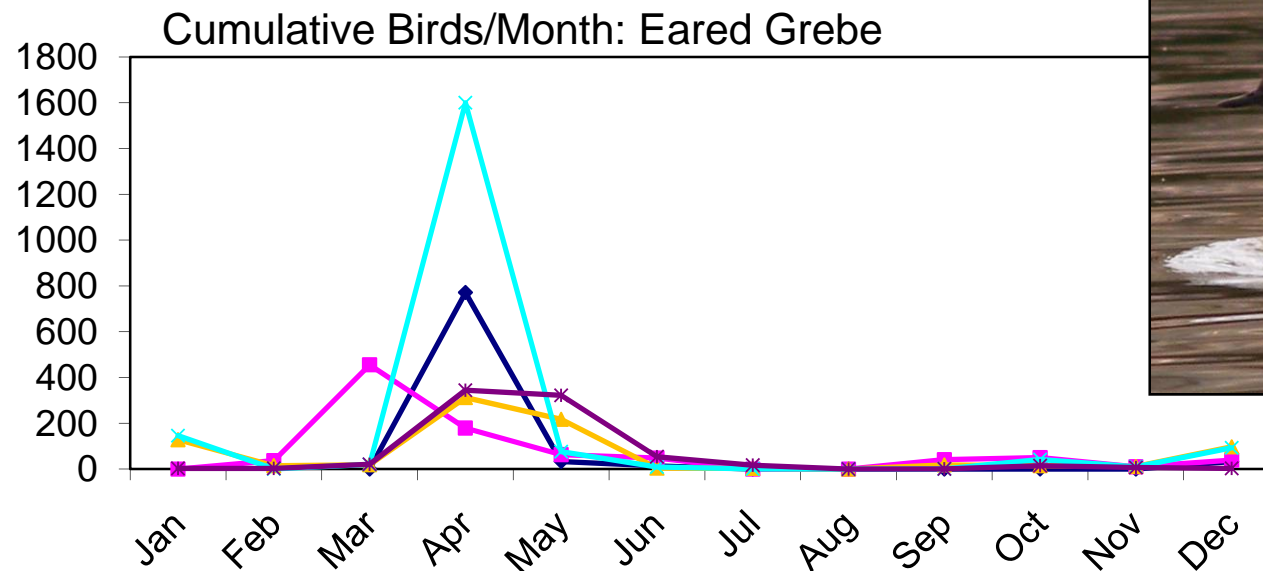
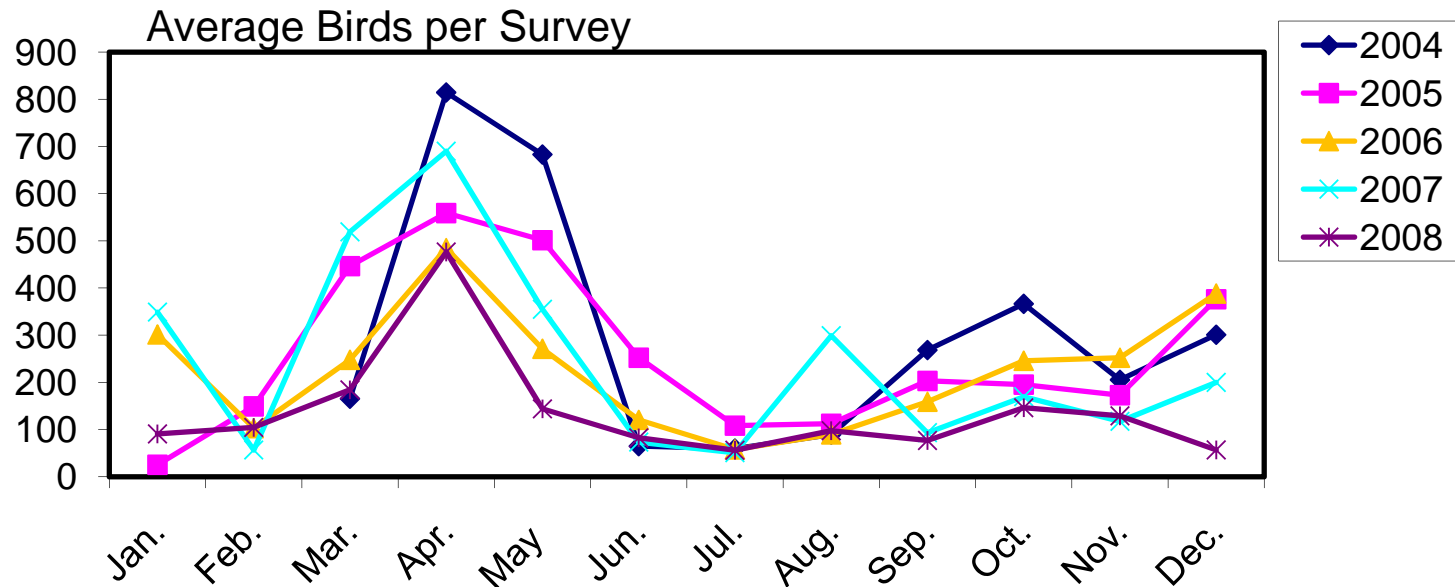
Lake Mead: Diving Carnivores



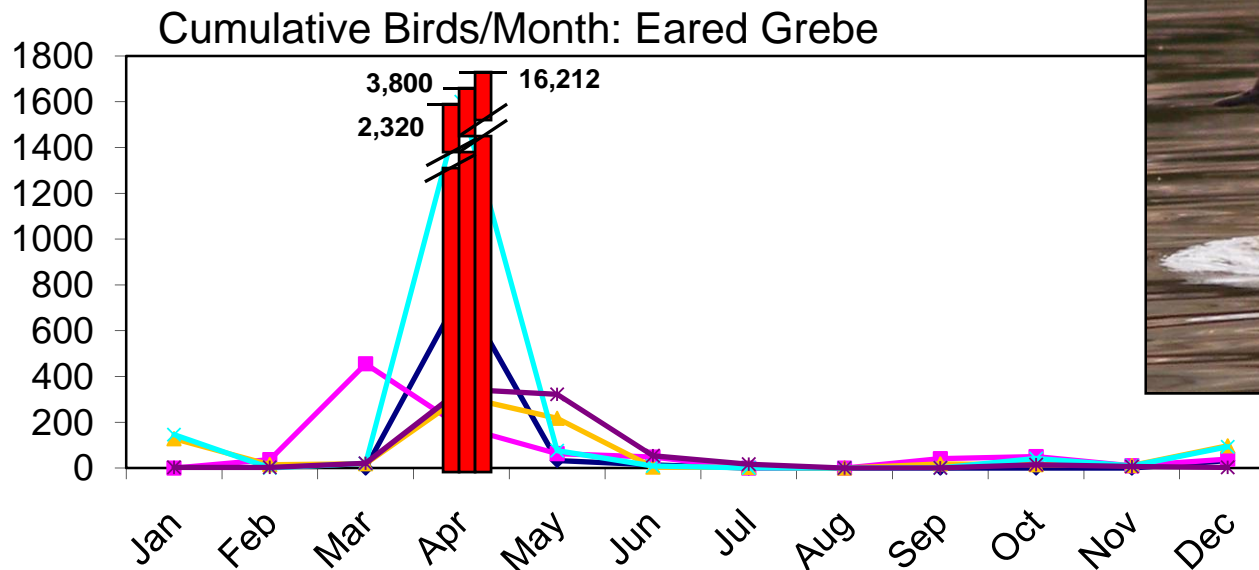
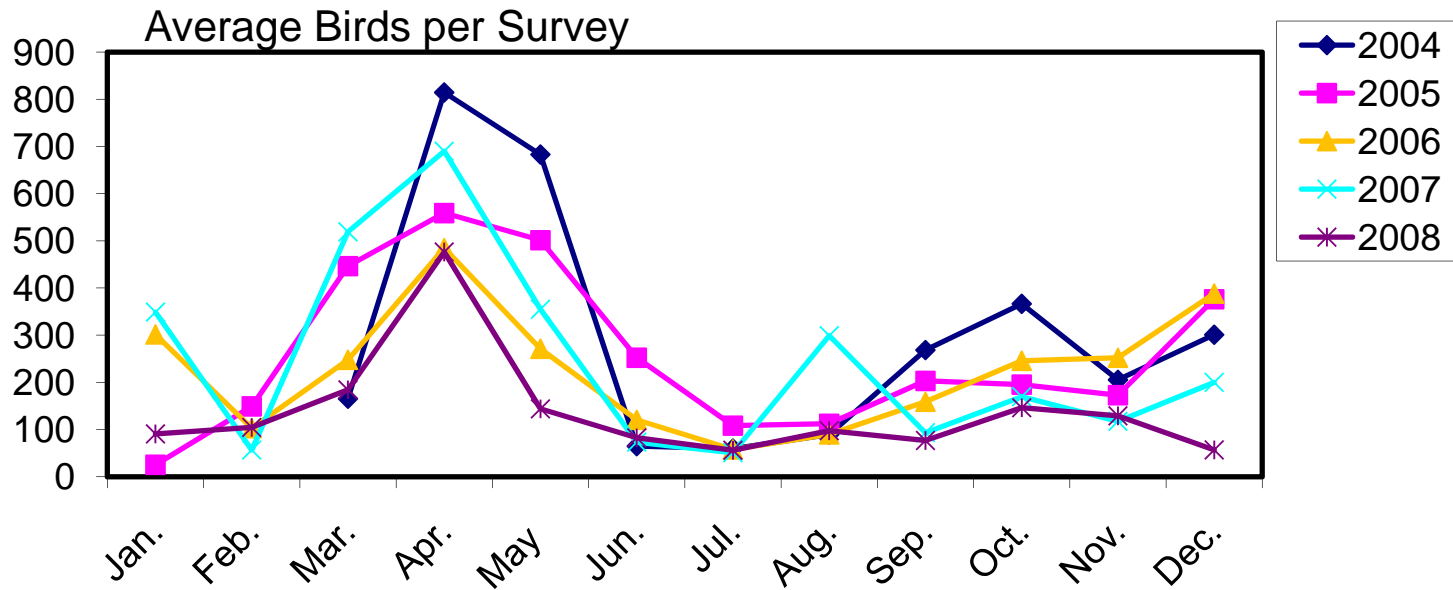
Lake Mead: Diving Carnivores



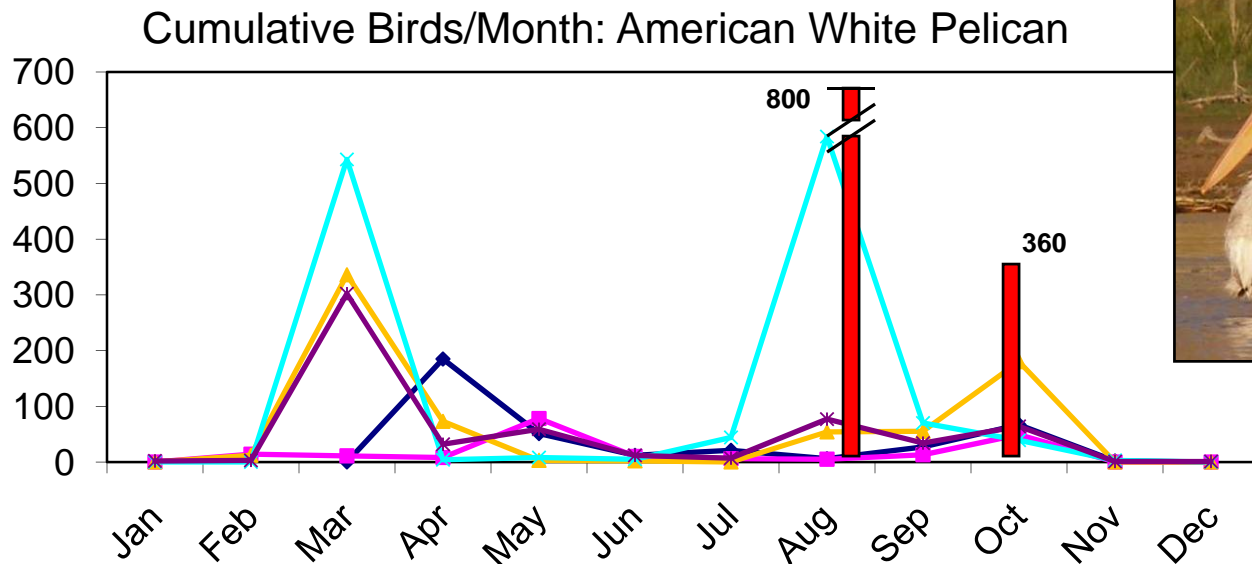
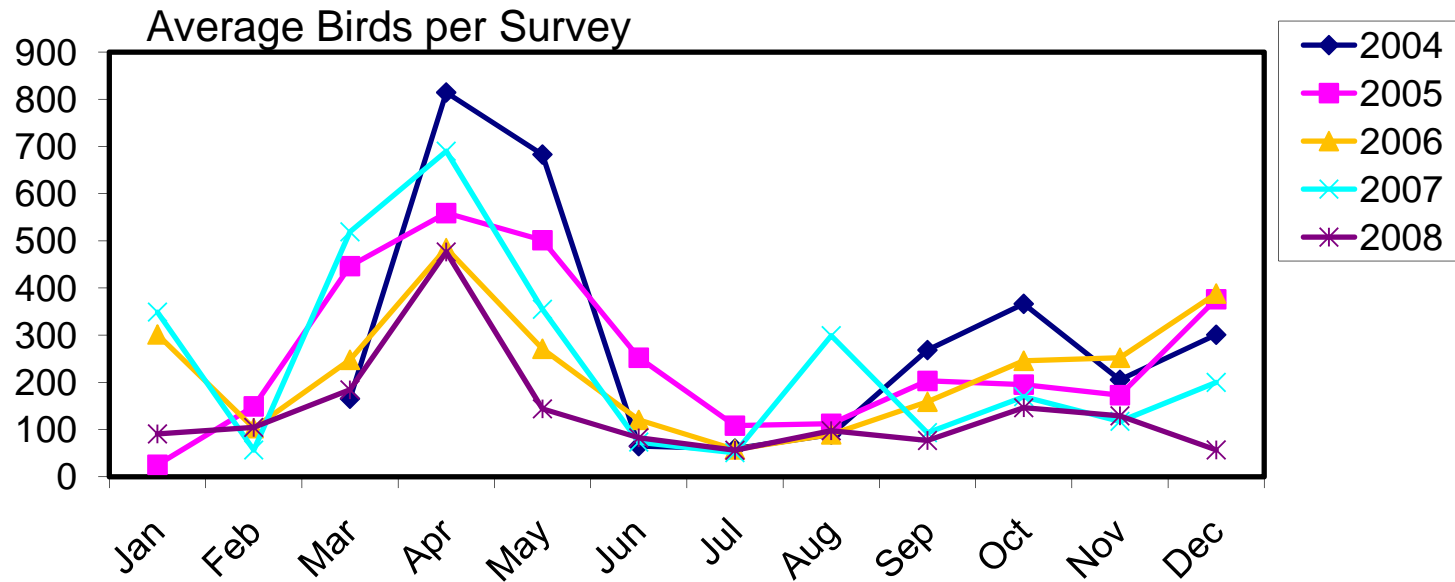
Lake Mead: Diving Carnivores



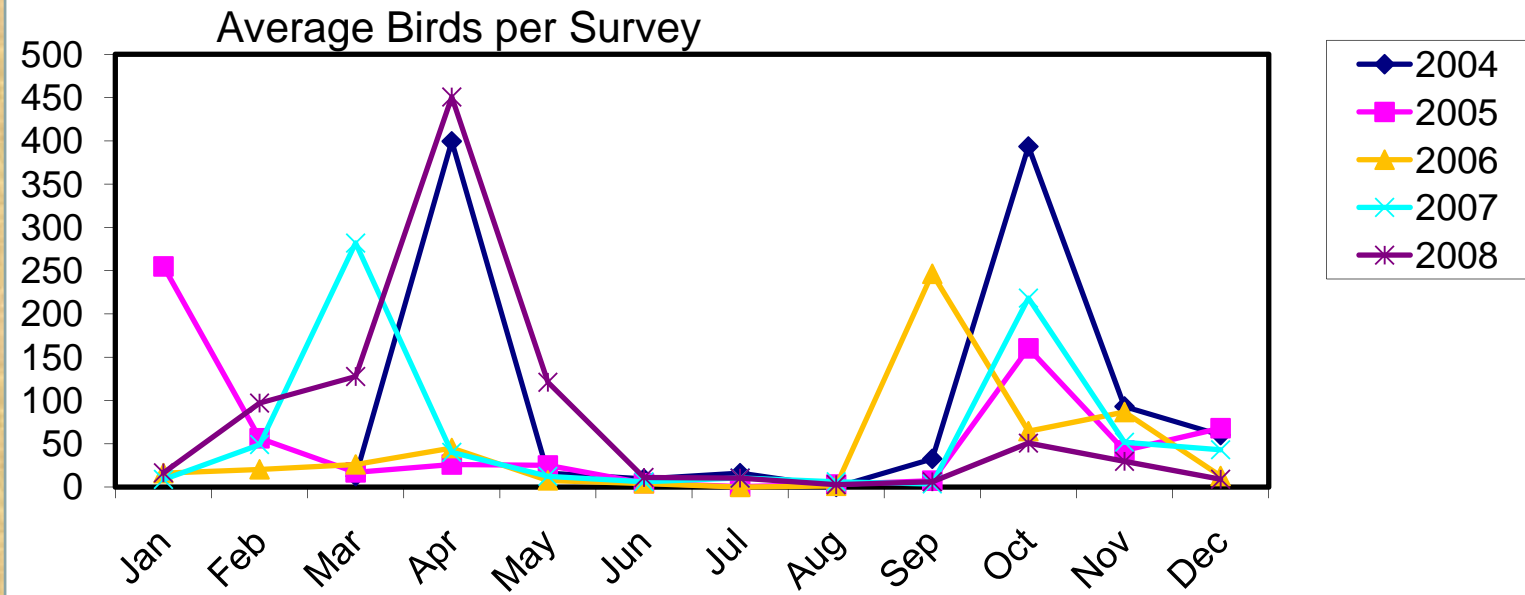
Lake Mead: Diving Carnivores



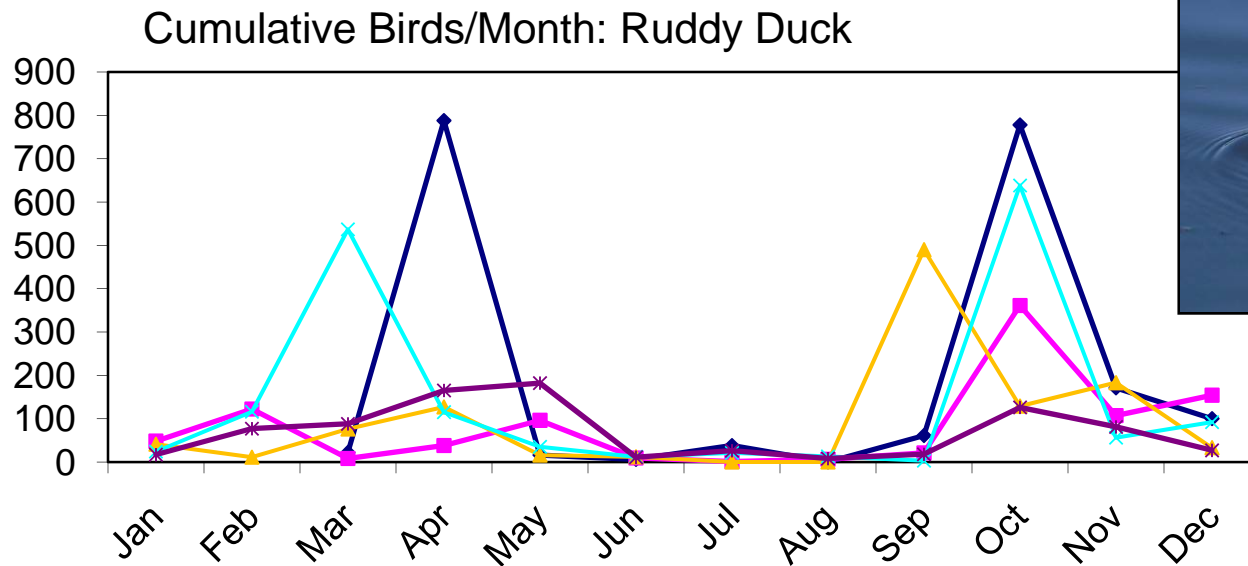
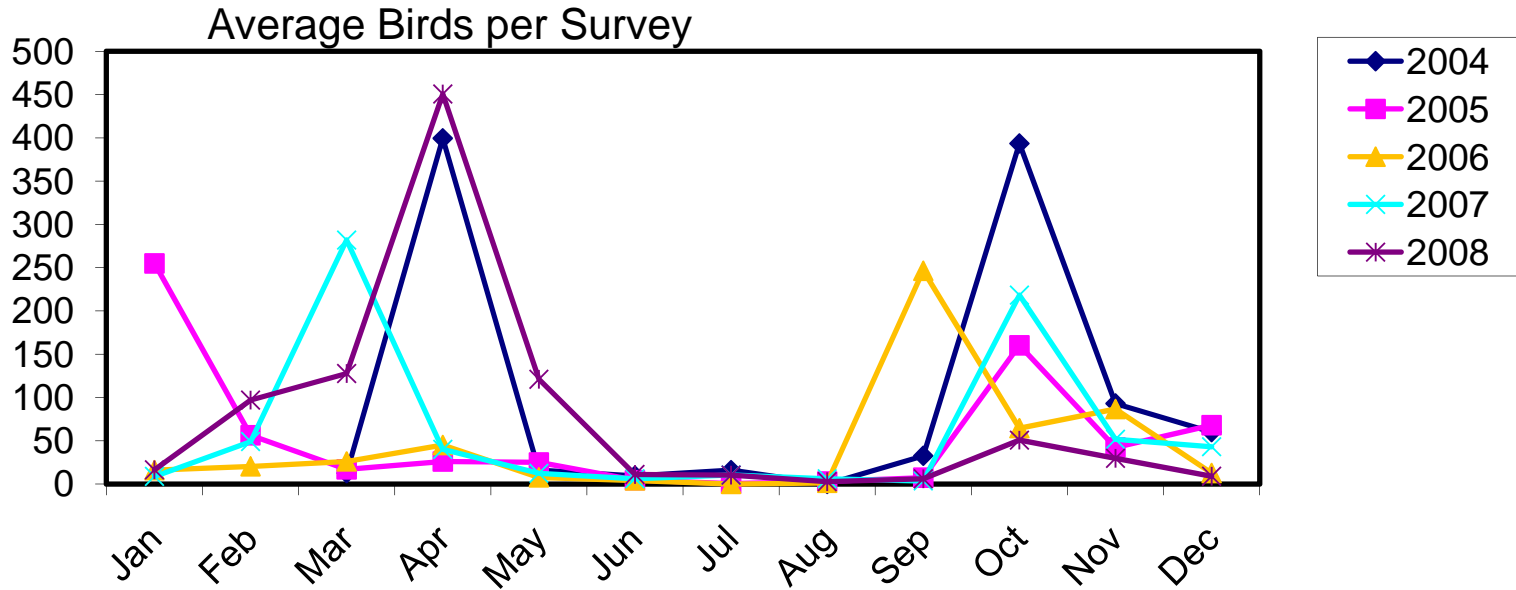
Lake Mead: Diving Carnivores



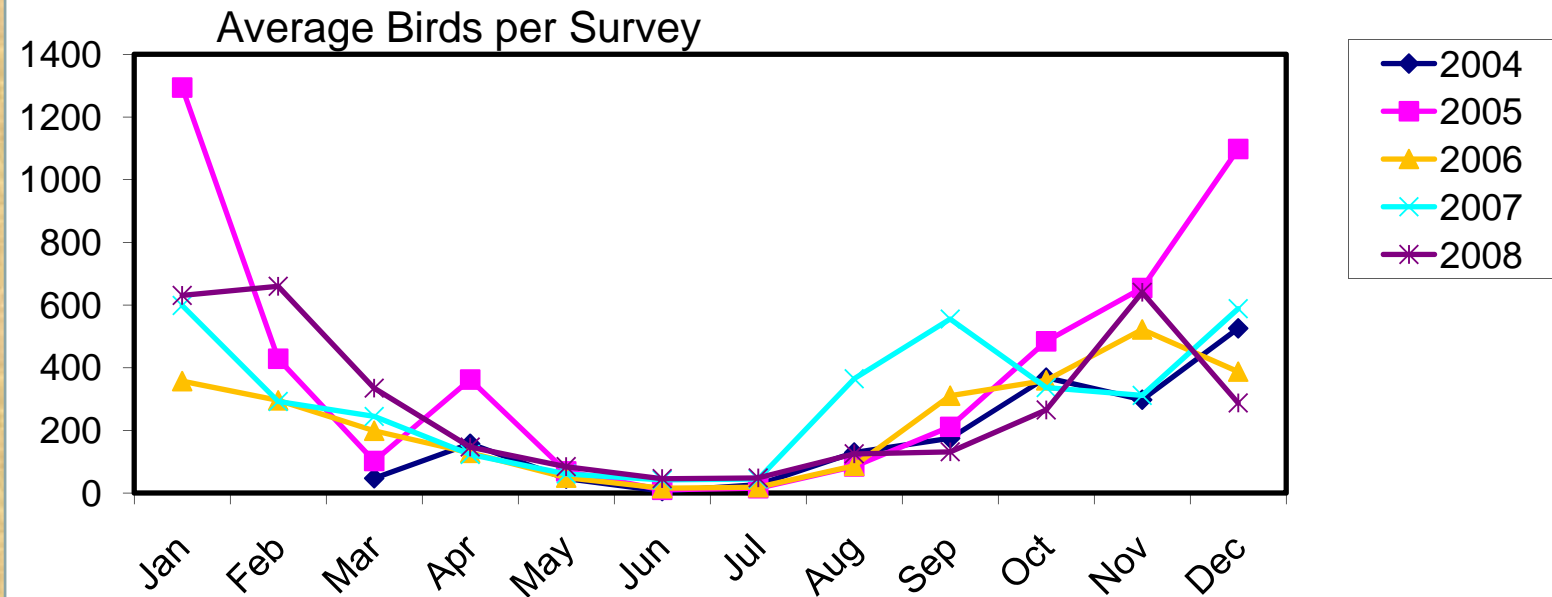
Lake Mead: Diving Omnivores



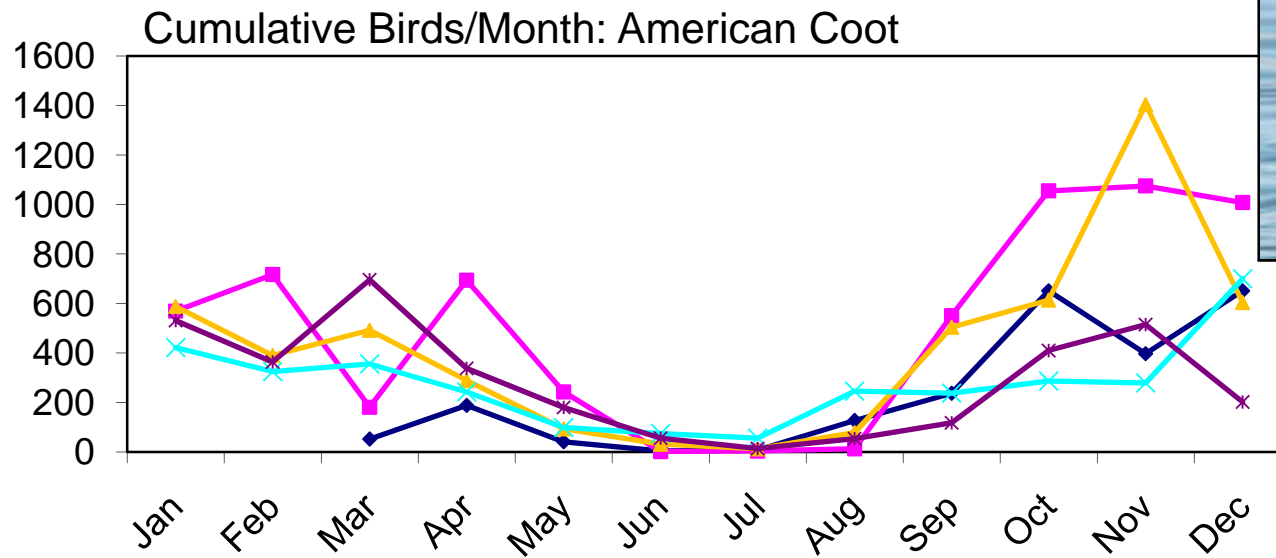
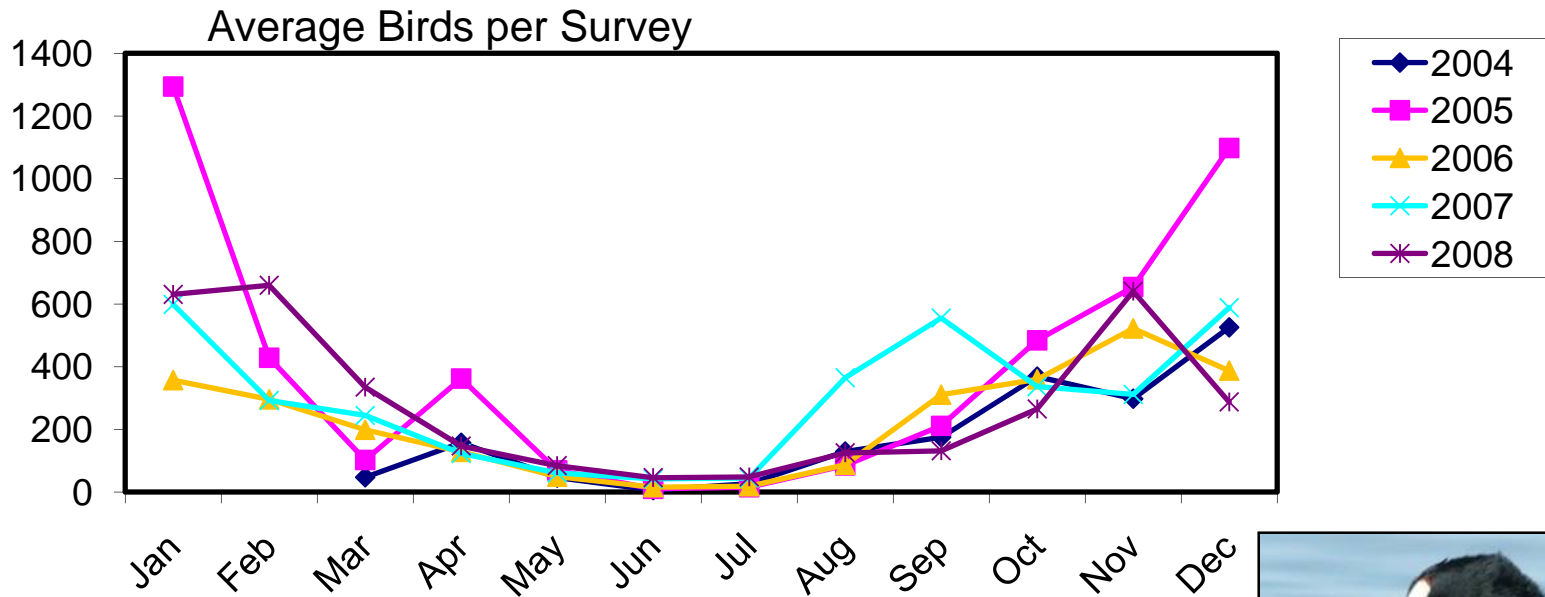
Lake Mead: Diving Omnivores



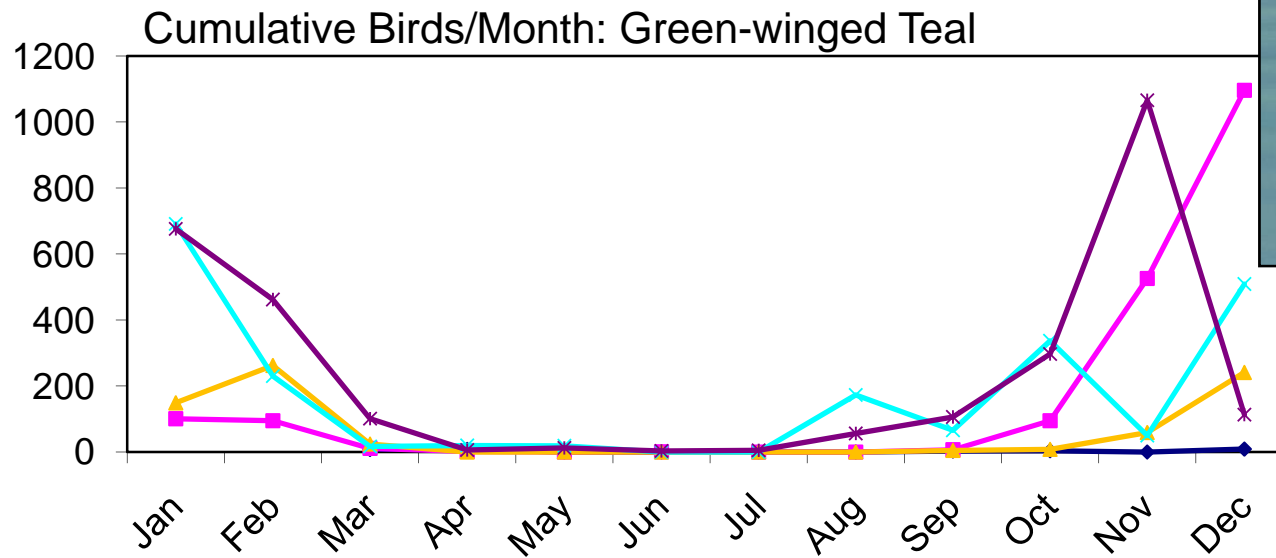
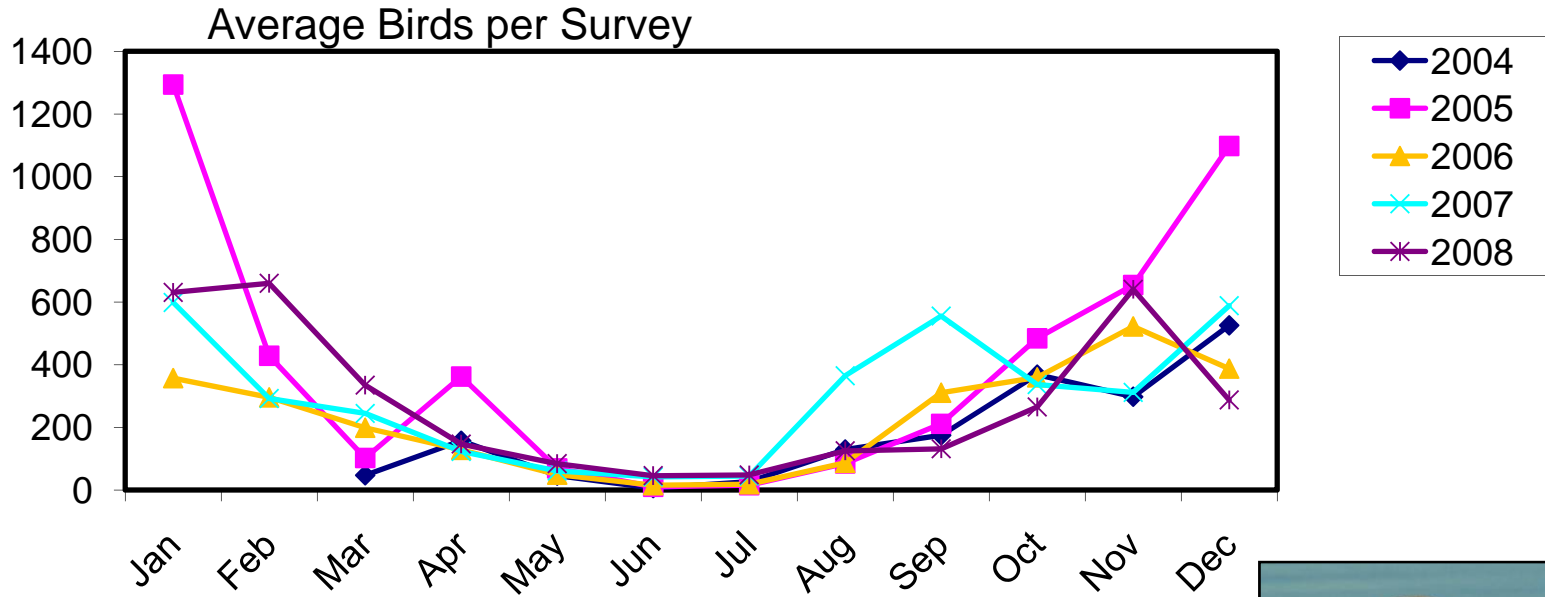
Lake Mead: Herbivores



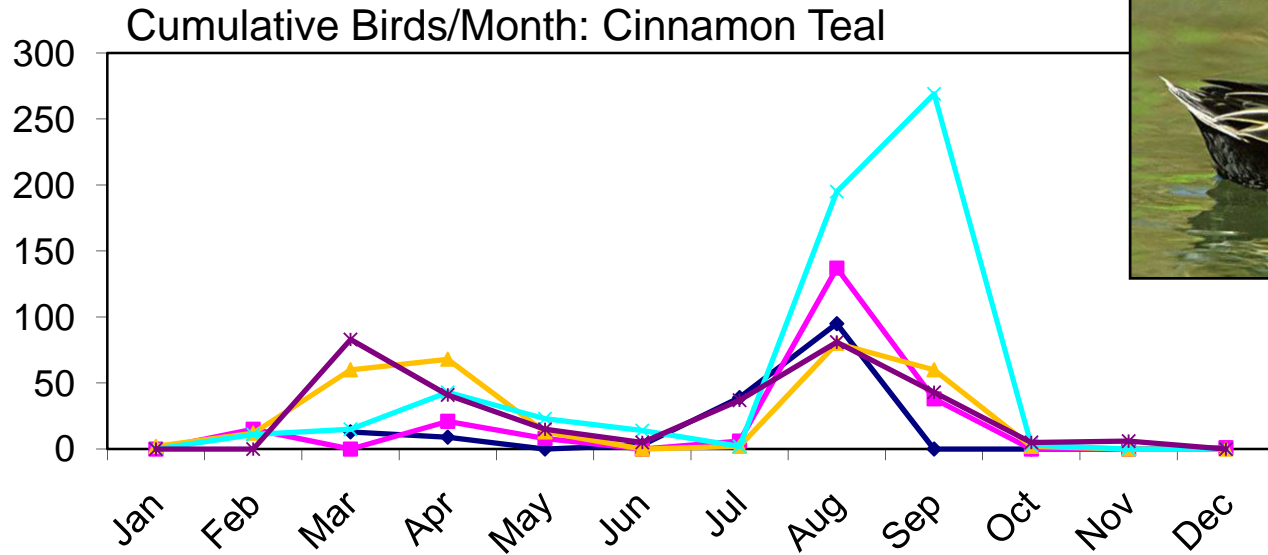
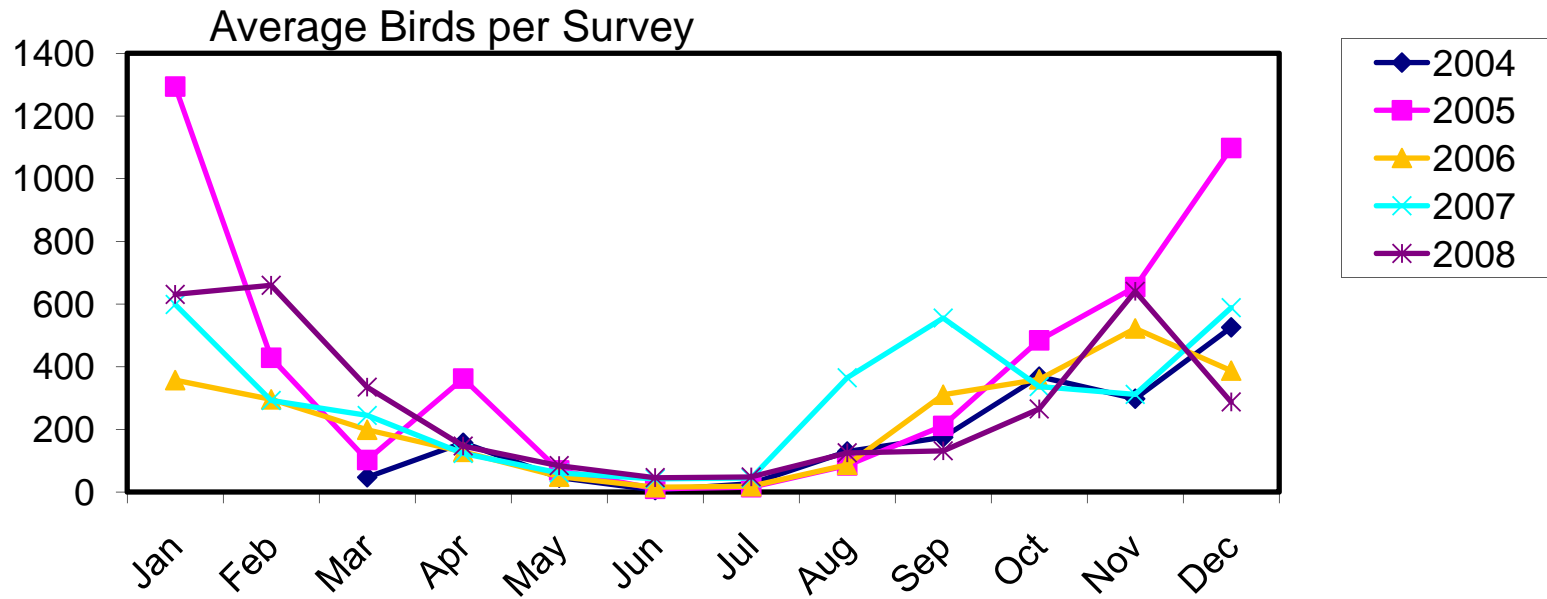
Lake Mead: Herbivores



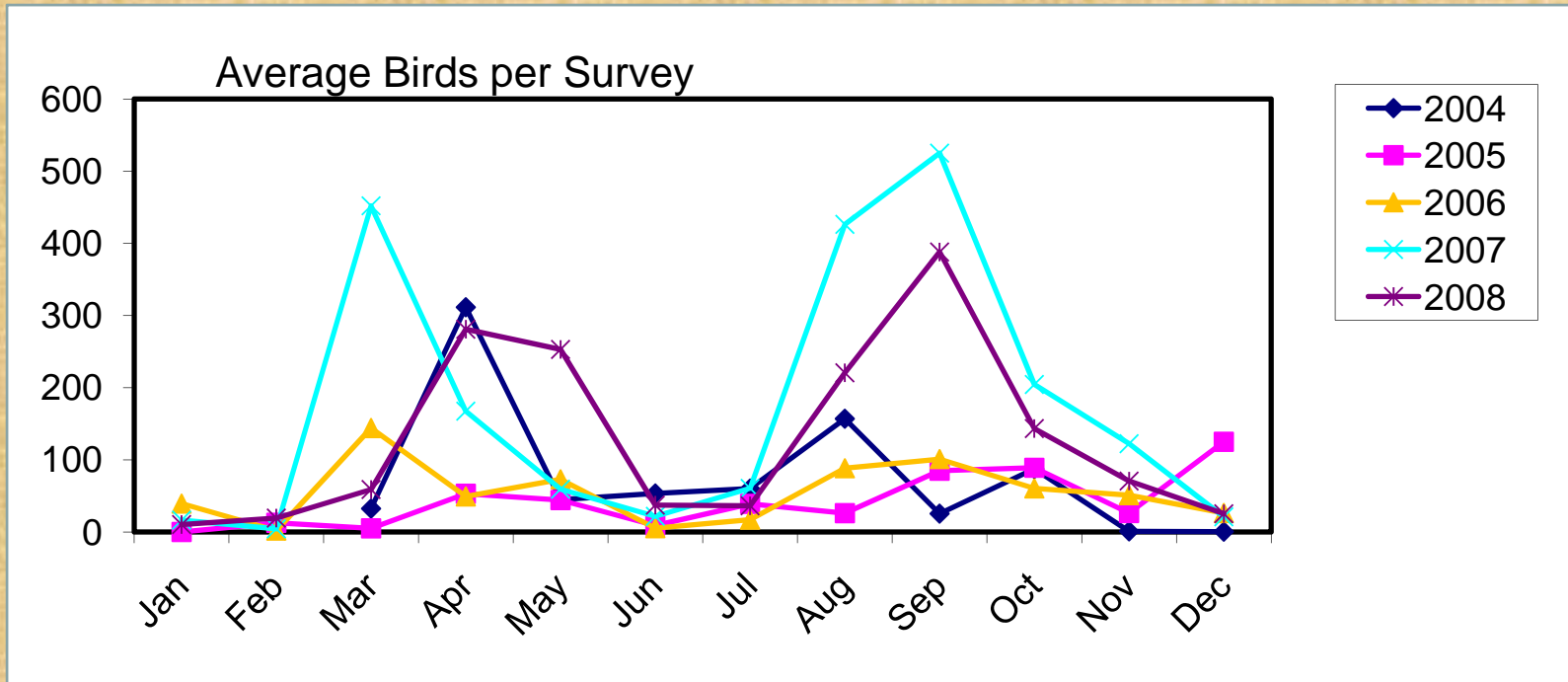
Lake Mead: Herbivores



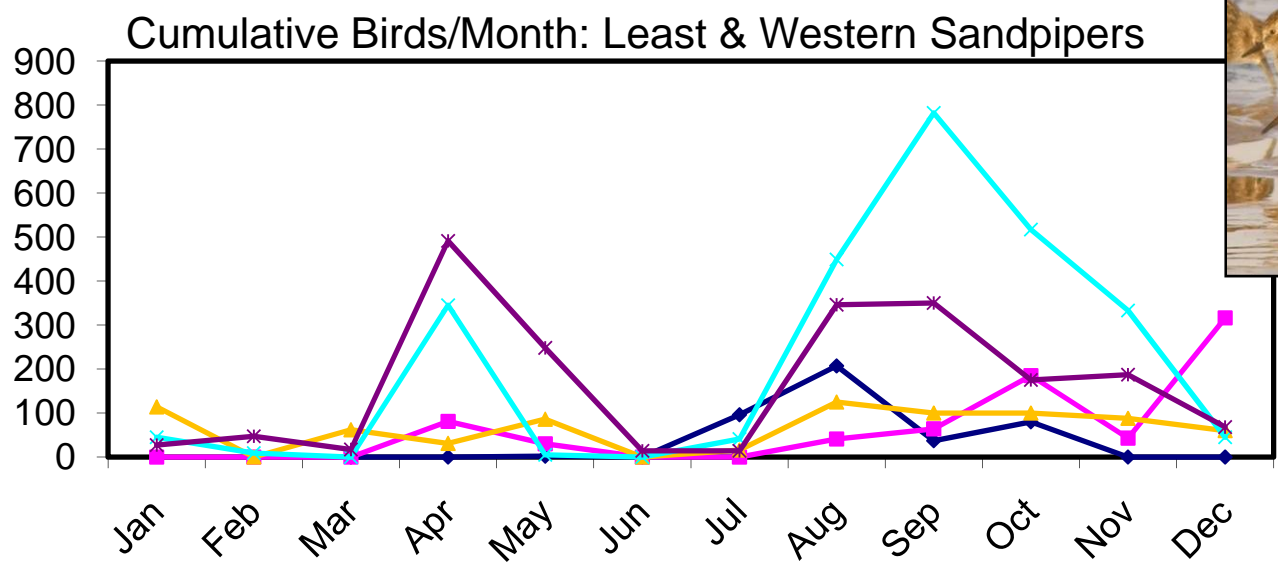
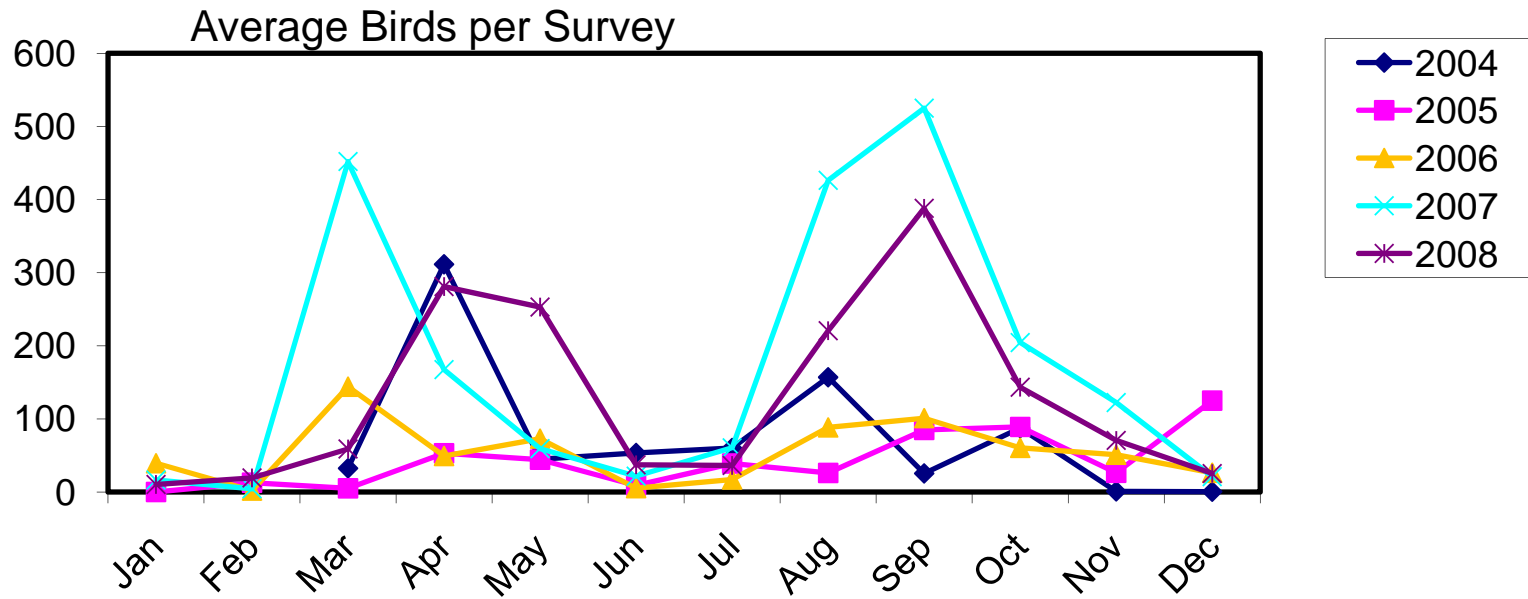
Lake Mead: Herbivores



Lake Mead: Shorebirds

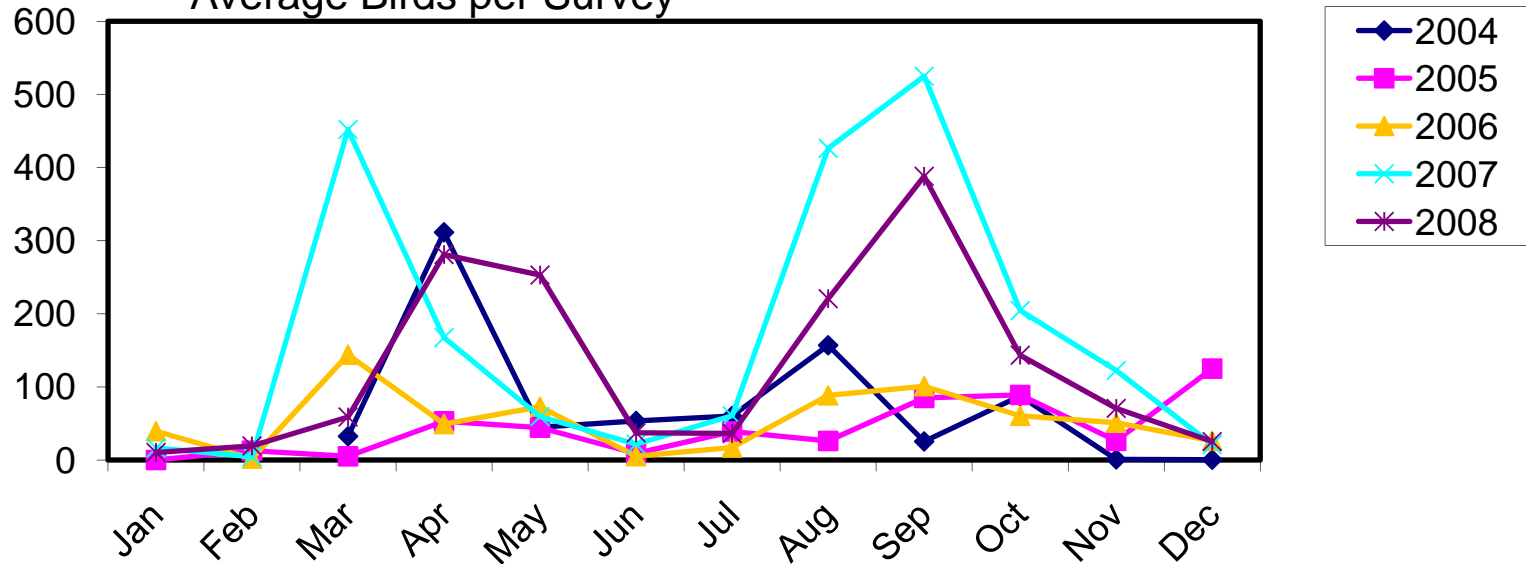


Lake Mead: Shorebirds

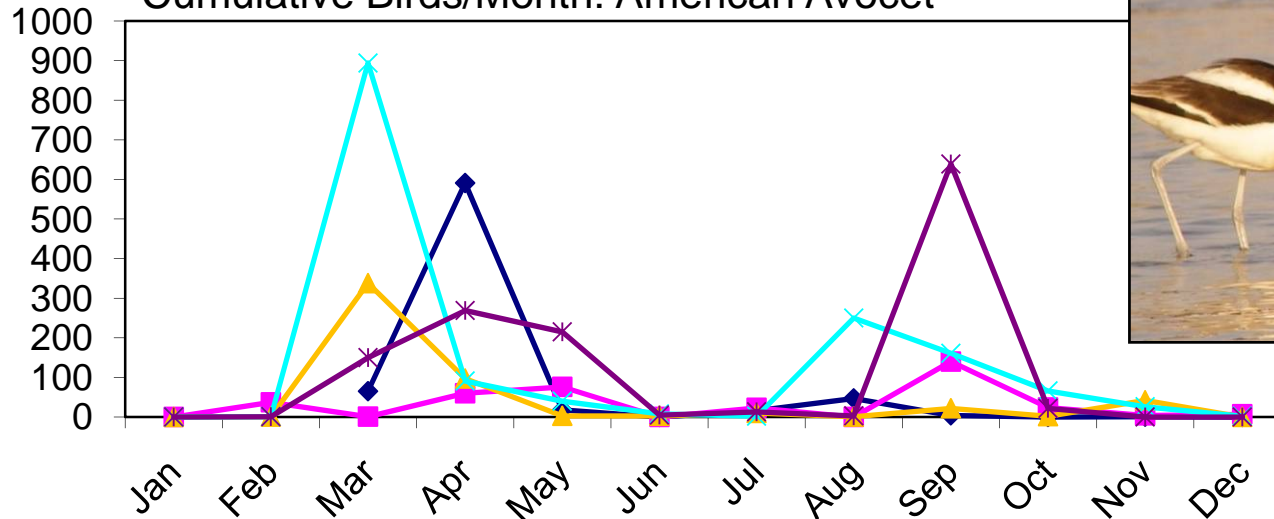


Lake Mead: Shorebirds

Average Birds per Survey

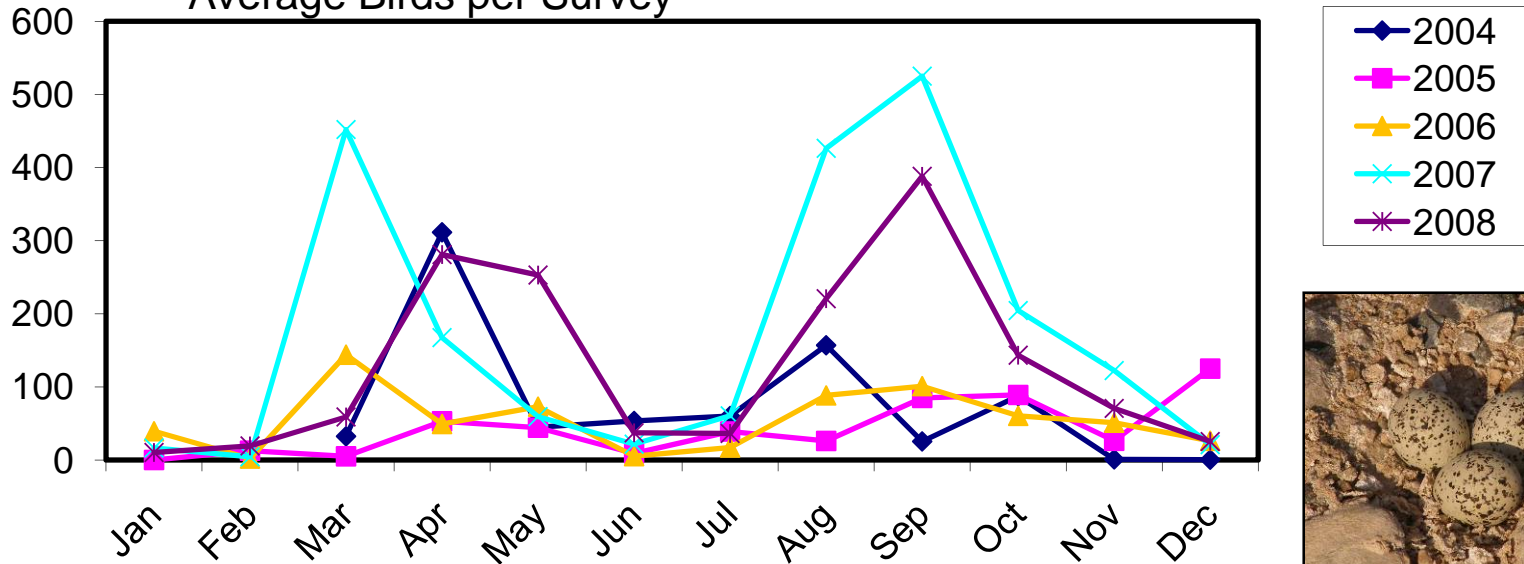


Cumulative Birds/Month: American Avocet

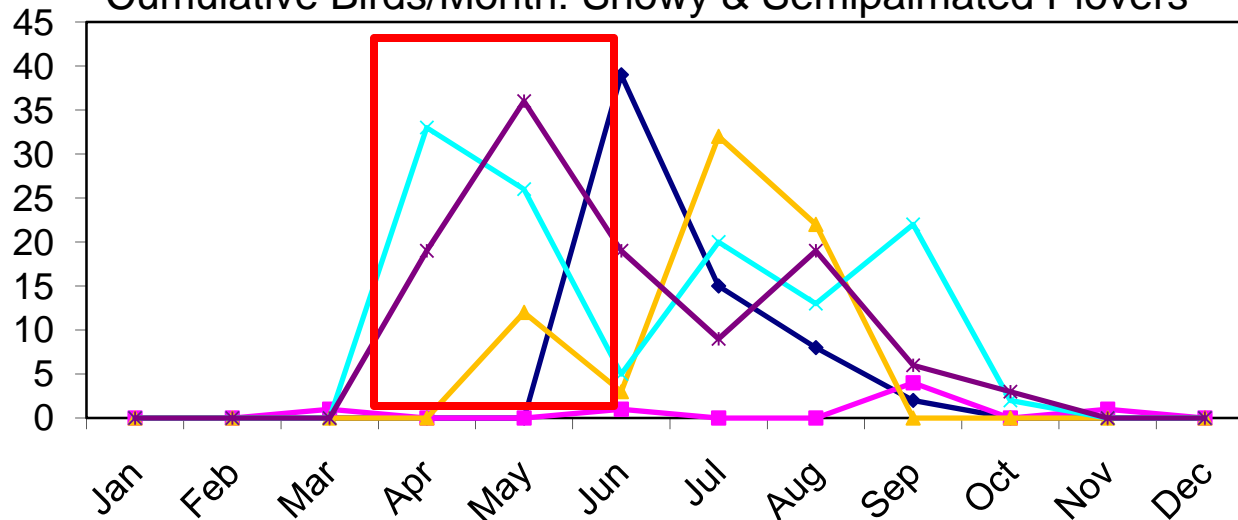


Lake Mead: Shorebirds

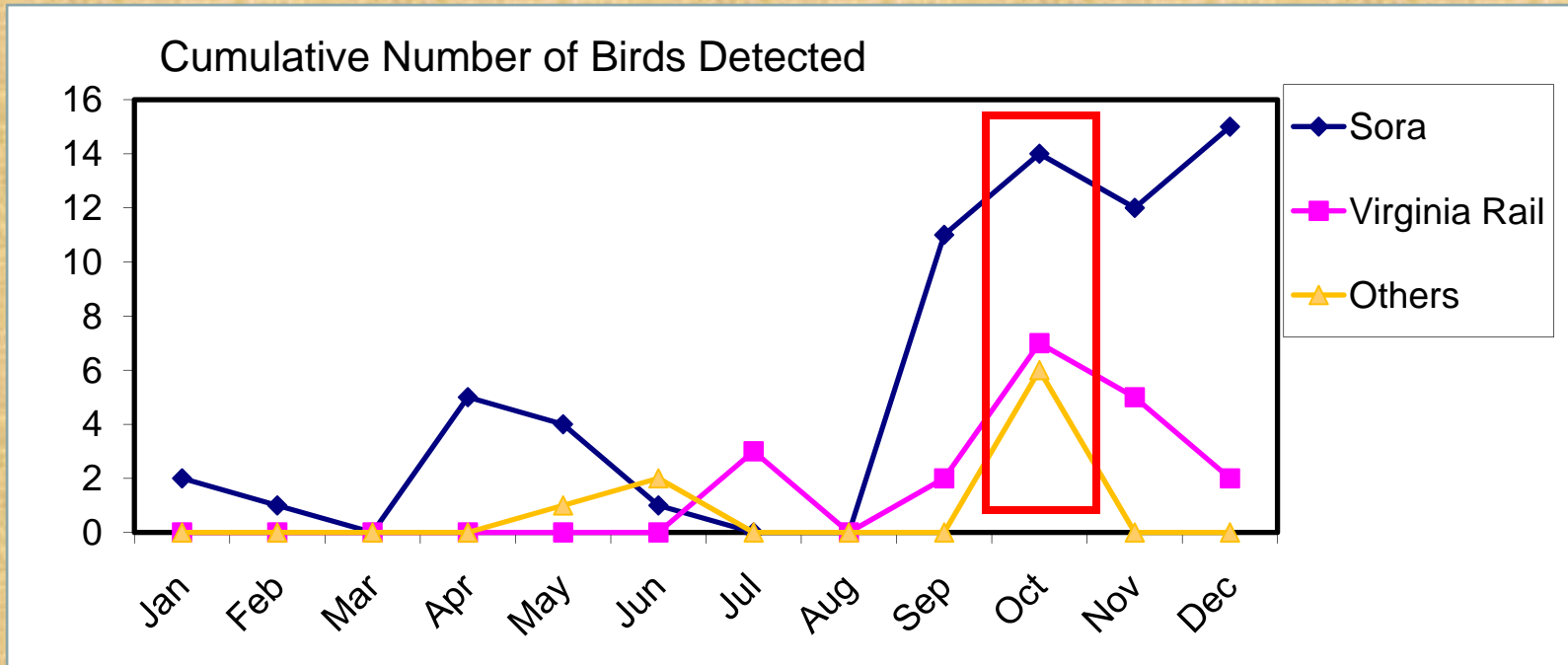
Average Birds per Survey



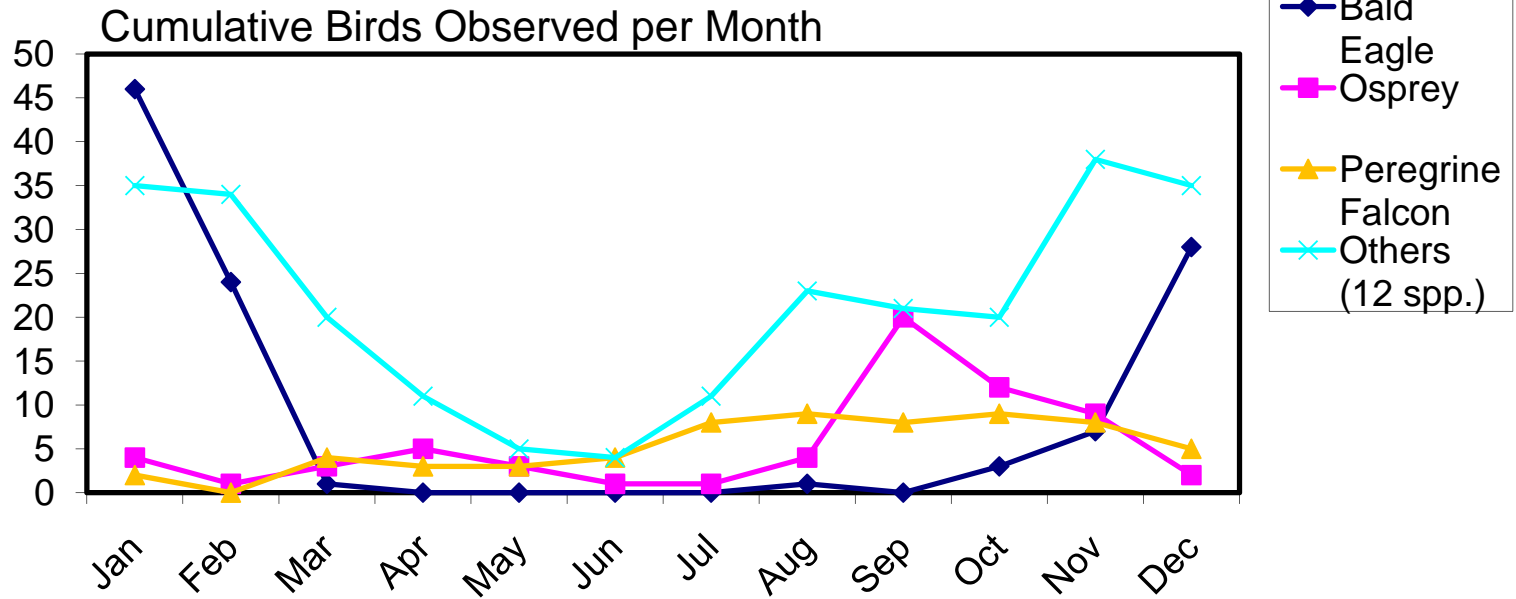
Cumulative Birds/Month: Snowy & Semipalmated Plovers



Lake Mead: Marsh Birds



Lakes Mead & Mohave: Raptors



Summary

- This study represents the first attempt to establish species use patterns within Lake Mead NRA
- Both Lakes Mead and Mohave represent valuable resources for many aquatic bird species



Potential current and future factors influencing bird abundance and diversity

- Ongoing drought conditions and changing lake levels
- Increasing municipal water use
- Annual regional weather variations
- Habitat alteration along migration routes and breeding grounds
- Introduction of Quagga Mussels in the Colorado River system
- Climate change...?

Acknowledgments

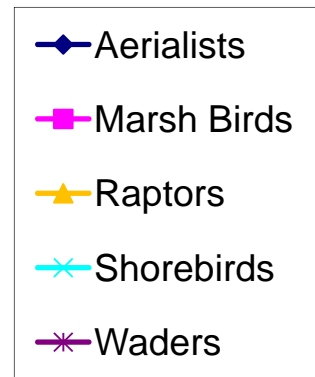
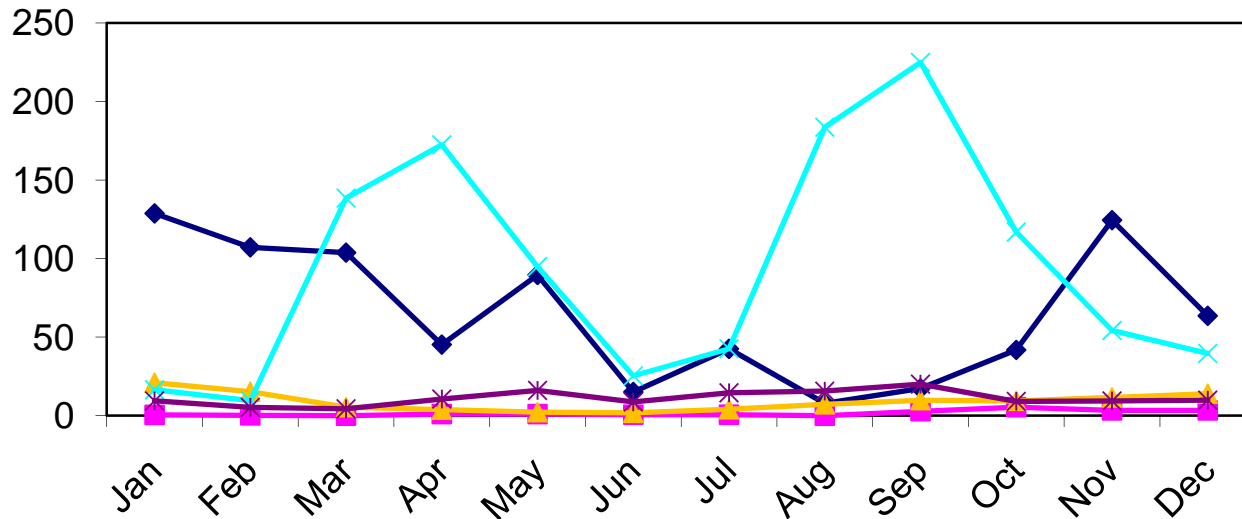
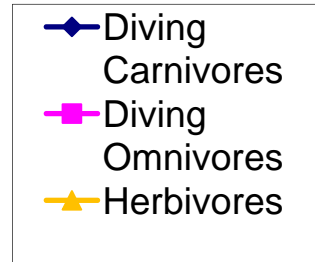
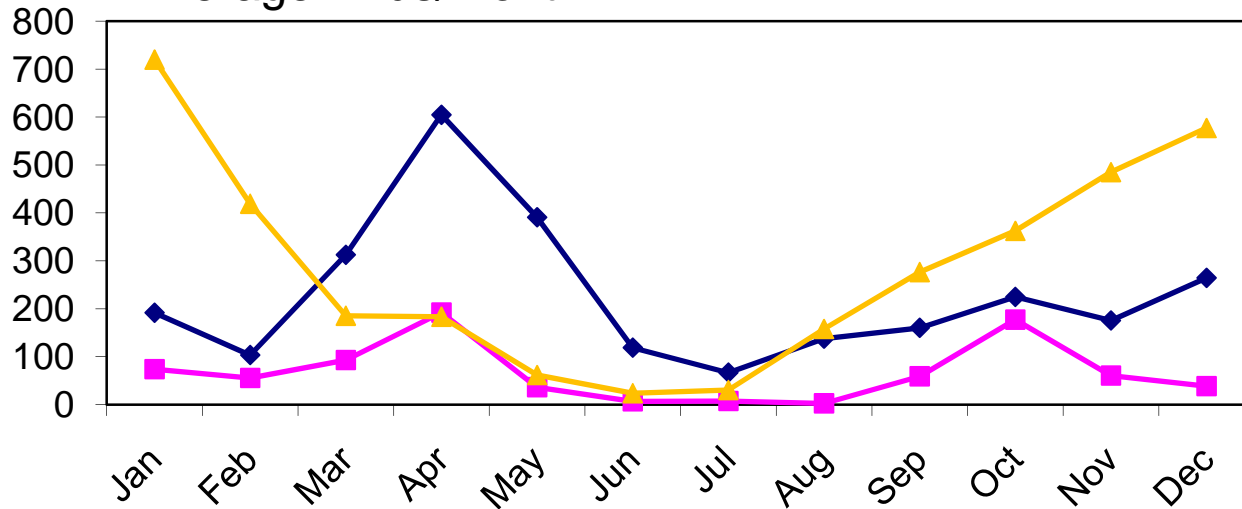
Funding: Lake Mead National Recreation Area, National Park Service; and Clark County, Desert Conservation Program (MSHCP)

Special Thanks To: Kent Turner, Ross Haley, Dawn Fletcher, Mitch Urban, Elisabeth Ammon, and Stacey Crowe



Lake Mead Cumulative

Average Birds/Month



Lake Mead Annual Distribution by Guild

