

# Oregon State University Colonial Waterbird Aerial Survey Protocol

## Adapted for Use by Malheur National Wildlife Refuge

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**Refuge-based Objectives** (Faye Healy, Jess Wenick): Use piscivorous waterbird monitoring to assess aquatic health of Malheur Lake. How do piscivorous waterbirds respond to a transition away from a carp-dominated lake?

- Nesting on Malheur/Mud Lake by Caspian terns, double-crested cormorants, American white pelicans
  - Identify nesting locations
  - Identify potentially suitable nesting habitat (i.e. suitably isolated islands)
  - Quantify colony size (at least number of individuals present, nest counts if possible; possibly Sod House Ranch cormorant colony)
  - Prioritize incubation period flight to allow better assessment of peak colony size over a chick-rearing period flight to assess productivity
- Total activity at Malheur/Mud Lake by American white pelicans
  - Counts of pelicans at colony, loafing areas, foraging areas
- Establish photo archive of important nesting, loafing, and foraging habitat for all three species

**Flyway-based Objectives** (Michelle McDowell): Contribute to flyway monitoring of Caspian terns and double-crested cormorants, particularly during period of intensive management of both species in Columbia Basin.

- Quantify colony size (nest counts) of Caspian terns and double-crested cormorants
- Detect any large (> 250 individuals) aggregations (nesting, loafing, or foraging) of double-crested cormorants immigrating into system

**Aircraft:** Fixed-wing Cessna 205 or equivalent

**Flight Altitude:** 400 feet above ground level. Lower flights risk disturbing nesting birds. Higher flights limit resolution of aerial photographs.

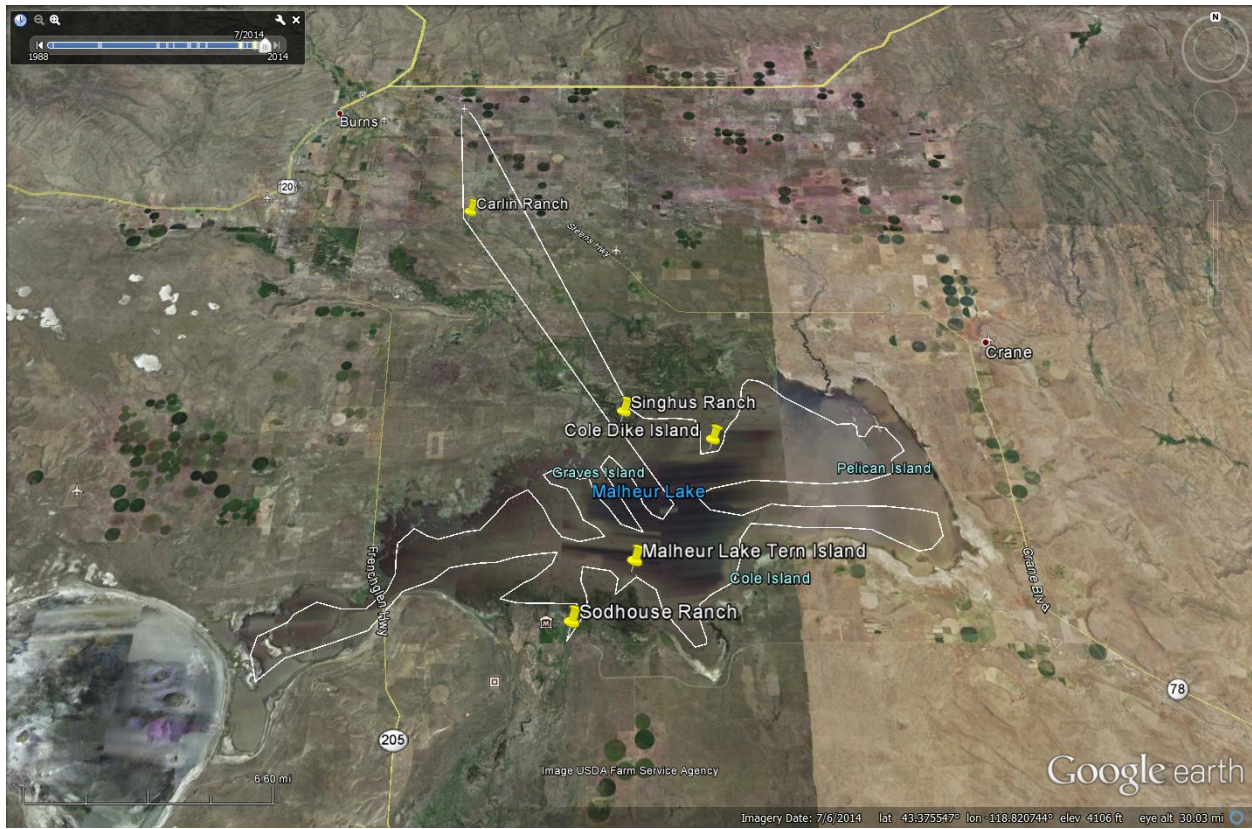
**Flight Speed:** Approximately 70-80 knots (80-90 mph) during regular transit (but aircraft dependent), slower speeds as necessary to view and photograph.

**Suggested Flight Path:** See attached Google Earth file “Malheur NWR Aerial Survey Flight Path.kmz”. Important locations during 2010-2014 OSU surveys:

Location	Latitude	Longitude
Singhus Ranch Island	43.381	-118.827
Cole Dike Island Old Tern Island*	43.356	-118.770
New Tern Island	43.282	-118.830
Sodhouse Ranch	43.266	-118.972
Carlin Ranch	43.502	-118.941

\*Old Tern Island is a site of historic Caspian tern nesting. The location for this site provided to us is essentially the same as Cole Dike Island, where American White Pelican nesting occurred in 2014.

A Google Earth image of the flight plan is below:



**Camera:** Digital SLR (e.g., Canon 50D, 7D)

**Lens:** 28-135mm

**Time of Flight:** mid-morning or mid-afternoon so that photographs are taken when birds are casting shadows to help distinguish posture of photographed birds. The best lighting typically happens around 10 am and 2 pm. Photographs taken around noon can be flat and featureless, with low contrast – best avoided.

**Exposure Advice:** Photographs of white birds roosting/nesting on white guano-covered rock (e.g., Caspian terns on the New Tern Island) can often be overexposed. To avoid this problem experiment with the camera's white balance settings. Choosing settings that slightly underexpose the images can help compensate at times.

**Preferable Weather Conditions:** Mostly sunny, to ensure birds cast shadows to improve photo quality. Most wind conditions are acceptable, although gusting winds will risk camera focus for photographs and increase any likelihood for air sickness.

**Collecting GPS Track of Flight and Georeferencing Photographs:** Using a handheld GPS unit (e.g. Garmin) or on-board GPS in the aircraft (if downloading track data is possible), it is relatively

straightforward to georeference photographs taken during the flight. These instructions are written for use of a Garmin handheld GPS unit.

- Turn on the GPS and let it acquire locations. Verify that the batteries are fully charged.
- Check that the camera time and date are the same as what the GPS is displaying (see camera manual to set time, if needed).
- Verify that the track log is turned “ON” in the GPS. (main menu/tracks).
- Verify that the GPS is recording locations based on time, and the “Wrap When Full” option is turned OFF (Main menu/tracks/setup).
- Place the GPS on the dash of the aircraft so that it has a good view of the sky.
- Fly the flight and take pictures...you can pretty much ignore the GPS for the time being although it may be useful to make waypoints to corresponds to notes.
- After the flight DO NOT save the track- just turn the unit off. Saving the track will cause you to lose any previously saved tracks.
- When back on the ground download photos to a computer.
- Import the tracks from the GPS to your computer. You can use the software provided by the manufacturer or freeware like EasyGPS (<http://www.easygps.com/>). The tracks may import as one file which is inconvenient if you flew multiple days. You can select each track once you have downloaded them and save them independently. This is not necessary, but will facilitate geotagging.
- Next, use the geotagging software (<http://www.google.com/search?q=gpicsync&ie=utf-8&oe=utf-8&aq=t&rls=org.mozilla:en-US:official&client=firefox-a>) to tag the pictures. This is pretty self-explanatory. Basically, it writes the coordinates based on the time stamp of the camera and the GPS. The UTC offset should be -7 (Greenwich Mean Time minus 7 hours) during the breeding season, but this might have to be tweaked depending on your location and the time of the year. If you choose the “Export to Google” option it will import the track and the picture thumbnails into Google Earth. This is a quick and dirty way of checking the coordinates.
- You can also download a freeware program (<http://www.photome.de/>) that will look at your picture metadata. This is optional but is nice to use if you want to access photo information quickly, including coordinates.

Photo exposure adjustment, photo-stitching and GIS processing: TBD

**Species of Interest:**

Caspian Tern



Double-crested Cormorant



## American White Pelican



### Flight Tasks:

- Observe and photograph previously known colonies/sites:

Location	Species
Singhus Ranch Island	Caspian Tern Double-crested Cormorant American White Pelican Gulls
Cole Dike Island/Old Tern Island	American White Pelican Caspian Tern
New Tern Island	Caspian Tern Gulls
Sodhouse Ranch	Double-crested Cormorant Great Blue Heron Great Egret
Carlin Ranch	Double-crested Cormorant Great Egret

- Identify and photograph any new colonies of American White Pelicans, Caspian Terns, Double-crested Cormorants
  - Carefully view and photograph any aggregations of these species on land, particularly on isolated islands.
- (Optional) Detect and Photograph any aggregations of American White Pelicans (nesting, foraging, or loafing) larger than 20 individual birds. Photos of this type could be used to quantify how many pelicans are using Malheur Lake on a given day. From previous observations, we know many more pelicans use Malheur Lake than actually nest in the Harney Basin. These extra birds could be nesting in another basin (pelicans are highly mobile, commutes of 10s or even 100s of km are not difficult) or they could be non-breeding birds (either young birds, or breeding-age adults that did not initiate a nesting attempt).

### Post-Flight Tasks:

- ASAP: Review photos of colony locations where terns, cormorants, and/or pelicans were present. Are photos of good enough quality to count individuals of the respective species? Can terns be distinguished from gulls? Can tern posture be discerned to identify terns potentially sitting on nests? Can cormorant nests be identified? Depending on annual needs, determine if photos are sufficient or if additional photos are needed.
- As needed: perform counts of individuals on nests (terns, cormorants), or all individuals present (pelicans, and terns and cormorants if photographs and/or limited resources precludes counting nests) using GIS.