

Botulism protocols for the DESFBNWR

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**WHAT IS BOTULISM**

Avian botulism outbreaks most typically occur in late summer/early fall when warm temperatures and an abundance of decaying organic matter (vegetation and invertebrates) combine to present ideal conditions for the anaerobic soil bacterium *Clostridium botulinum* to flourish along water bodies. Birds which accumulate the active bacteria and its associated toxin exhibit paralytic symptoms—uncoordinated swimming, loss of flight capacity, flaccid neck and leg muscles. Drowning, predation, respiratory failure and electrolyte imbalance kills sickened birds. Birds treated for dehydration often recover. Carcasses provide additional organic material

for the *C. botulinum*, further fueling the outbreak, and fly larvae which have fed on contaminated carcasses serve as concentrated sources of the toxin so potent that ingestion of 3 or 4 maggots can sicken a healthy bird. (USGS Factsheet: Avian Botulism).



## **WHERE DOES IT OCCUR ON THE REFUGE?**

San Francisco Bay Bird Observatory (SFBBO) regularly monitors Artesian/Mallard Slough and lower Coyote Creek in Santa Clara County during spring and fall for signs of avian botulism. Coyote Creek Lagoon is difficult to access with a motorboat due to shallow water and mud flats, so it is not surveyed by SFBBO. Large numbers of botulism-affected birds in Artesian Slough/Coyote Creek, coupled with late fall hot/dry weather, signal a potential botulism outbreak in Coyote Creek Lagoon. Therefore when this situation occurs, SFBBO alerts Refuge personnel who survey Coyote Creek Lagoon with an airboat.

Coyote Creek Lagoon, which is part of the DESFBNWR, consists of 240 acres of shallow water with mudflats and a channel that runs between Coyote Creek and Mud Slough. With the exception of the channel, the mudflats are exposed except during high tides. The area was originally diked baylands used for agriculture. It was excavated and opened to tidal action in 1985. Since then it has silted in creating mudflats. The area is used during low tides by roosting gulls and feeding shorebirds, and during fall and winter by wintering waterfowl.

Silt is accumulating in Coyote Creek Lagoon, and it is becoming shallower. This could contribute to more frequent botulism outbreaks in the future. Botulism outbreaks usually occur in the fall, which coincides with the arrival of wintering waterfowl in the Bay Area. It is therefore critical that Coyote Creek Lagoon continues to be monitored each fall, and that Refuge staff be prepared to immediately respond to any signs of botulism outbreak.

The Santa Clara Valley Water District monitors botulism in their “duck pond” mitigation site

near the San Jose wastewater treatment plant and Newby Island Landfill in the Alviso area. They alert Refuge staff of the potential for problems at Coyote Creek Lagoon if they have an outbreak.

The Refuge became responsible for the Alviso salt ponds (spanning east to west from A1 to A8) in March 2003 through land acquisition. Thus Refuge personnel also monitor these ponds for avian botulism. Past ponds with botulism outbreaks include A5, A7, A16, A3W, and AB2. The Refuge is usually alerted by SFBBO, USGS, or others who are doing research and monitoring on the ponds about the possibility of an outbreak here or about seeing numbers of dead birds in the ponds. Ponds A1-A8 were opened to tidal flow in July of 2004, decreasing their salinity and perhaps making them more suitable for *C. botulinum*.

Cargill Salt reports that they never observed botulism problems in prior years. Ponds A9 to A17, north of the newly acquired ponds, have been under Refuge ownership since the 1970's without experiencing any such outbreaks.

## WHAT DO WE DO ABOUT IT

After being alerted to the possibility of an outbreak (dead birds in an area we monitor or dead birds in an adjacent area), surveys of Coyote Creek Lagoon, ponds A5 and A7 (or others with large numbers of dead/sick birds) should be surveyed immediately. During an outbreak event, botulism surveys are conducted approximately every 2-3 days, or as tidal conditions permit. They stop when surveys recover only a few birds ( $\sim < 10$ ), often preceded by a drop in temperature and some rain. Rain, cooler temperatures, and high tides that flush the Lagoon usually diminish the botulism outbreak.

Available Airboat Drivers (as of August 2008): Joy Albertson, Juan Flores, Eric Mruz, Diane Kodama, Gerry McChesney

### Materials needed for surveys:

- Heavy duty garbage bags (3mm thick) for dead birds. Secure the bag in a large plastic container with a bicycle tire around the lip.
- Rubber gloves (ones used for herbicide treatment work best)
- Pet carriers or sturdy cardboard boxes, supplied with two clean rags
- Fishing nets or pool skimmers (without pouch)
- Write in the rain paper (for tallying retrieved birds), clipboard w/ pen
- Sunblock, sunglasses, and plenty of water
- Hip boots
- Life vests (float coats are usually too hot), knee pads and several plywood boards for walking on the mud, and the usual airboat supplies. (Airboat only)
- Key card (to access San Jose boat ramp gate. Airboat only)

## Preparation for surveys:

Botulism outbreaks usually occur in the fall, coinciding with the arrival of wintering waterfowl in the SF Bay Area. It is therefore critical that Refuge staff be prepared to immediately respond to any signs of a botulism outbreak. Actions to be taken in late August/early September include:

- Weather monitoring in late August/early September. If there has been a long period of hot, dry, windless days, contact SFBBO, Sunnyvale and San Jose Sewage Treatment Plants and ask if they have been seeing signs of botulism. Or send an e-mail to contacts involved with botulism (updated 2008):  
crobinson@sfbbo.org, smoskal@usgs.gov, nathearn@usgs.gov,  
brian.j.popper@aphis.usda.gov, MTaylor@ebparks.org, april@sfei.org,  
Butch\_Paredes@cargill.com, sfbay\_urbanrunoff@yahoo.com

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deborah\_bartens@city.palo-alto.ca.us, Padley@valleywater.org,  
Eric.Dunlavey@sanjoseca.gov, kmccumby@ci.sunnyvale.ca.us,  
Penelope.Delevoryas@ci.mtnview.ca.us

- Put Refuge staff on “heightened alert” and give a refresher on “botulism signs”. Staff who regularly work around the Alviso pond system should check levee edges (particularly in Ponds A5 and A7). Key staff include: Salt Pond ROS and maintenance worker, EEC staff, Wildlife Services trappers, and DESFBNWR Manager.
- Have maintenance staff do tune-ups and preventative maintenance on airboats.
- Check supplies of heavy duty garbage bags, pet carriers, etc. and order more if needed.
- Check with SFBBO to make sure the Cannery freezer is empty. Check with USGS to make see if their freezer in Refuge shop is empty (Nicole Athearn agreed to make their new freezer available for botulism season). Check the Bio freezer if empty; ask Brian Popper of Wildlife Services to empty if full.
- Call Wildlife Center of Silicon Valley to confirm they still rehab botulism birds (availability of rehabbers tends to fluctuate). Make arrangements in advance (at least one day before) with the Wildlife Center of Silicon Valley to drop-off sick animals at the Humane Society. Hours: 8-5, but they may be able to have someone waiting until 8 PM if needed.

## ***Coyote Creek Lagoon Airboat Surveys***

A Refuge airboat is launched on each survey from the San Jose Sewage Treatment Boat ramp which is between the dump and the EEC off Zanker Rd. The boat ramp is accessed via a gravel

road that intersects with Zanker Road immediately north of Artesian (Mallard) Slough, and just south of the sewage treatment plant. The gravel road is gated (need a San Jose Treatment Plant key card to open gate; Eric Mruz and SFBBO have this key) and marked with a sign ALE12.@

A Refuge airboat is launched on each survey from the San Jose Sewage Treatment “boat ramp”. Surveys were usually conducted from 2 hours prior to 2 hours after high tide, on days when the predicted high tide for “Coyote Creek, Tributary #1” **equaled or exceeded 7.6 feet**, the minimum tide needed to allow access to the entire shoreline. Tides less than 7.5 feet (as predicted for Coyote Creek Tributary #1) are too low to flood all of the mudflats. Therefore it is usually not worth going out on these days unless the objective is to go after sick/live birds in the shallows. Each boat crew consisted of a driver and 2 bird “scoopers”. The airboat driver slowly paralleled the edge of the entire shoreline, while the crew fished the birds out of the water and marsh vegetation using large fishing nets and pool skimmers. The dead birds were placed in a large garbage bag (no more than 25-30 per bag). For recovering sick birds, the “3-dive” rule is a good rule of thumb: if the bird dives and swims underwater 3 times without being successfully netted, it is probably too healthy to capture. Go after a sicker bird. It is easier to catch a live swimming bird if you can “herd” it into the shallows where you can see its “trail” as it swims underwater. Catching a diving/submerged bird in the channel or deep water is almost impossible. So is trying to pursue a live bird into the bulrush. Sick birds were placed in pet carriers with a rag loosely tied around the bird’s body and wings. An effort should be made to cover the entire edge of the Lagoon at least once each survey. Live sick birds are also captured in Coyote Creek. Live, sick birds can also be captured with fishing nets in the Lagoon pools and Coyote Creek.

### **Logistical considerations: (see also end of report for key information)**

“Meet time” for the crew at the maintenance shop should be 2-1/2 hours before the survey start time. Survey start time should be 1 hour before a predicted 7.6 foot tide level for “Coyote Creek Tributary #1”. The San Jose Sewage Treatment Plant “boat launch” is between the Newby Island landfill and the EEC off Zanker Rd. The boat ramp is accessed via a gravel road that intersects with Zanker Road immediately north of Artesian (Mallard) Slough, and just south of the sewage treatment plant. The gravel road is gated (need a San Jose Treatment Plant key card to open gate) and marked with a sign “LE12.” It is helpful to bring 2 vehicles, one truck to pull the airboat and deliver dead birds to the Cannery, while the other vehicle takes the live birds to the humane society. While driving, beware of joggers/hikers on the levee trails surrounding Coyote Creek Lagoon, especially during lunch hour when the adjacent business parks disgorge their employees.

### ***Land-based Recovery at Alviso Salt Ponds***

Notified weekly by SFBBO, USGS, or others of the conditions or presence of dead birds we send crews in pairs to recover dead and live animals. Dead animals are recovered with pool skimmer nets while live animals are taken by hand and immediately returned to the vehicle for deposit into a pet carrier. Attempts are made to keep the carriers shaded. Crews suit in hip boots and gloves

patrol the edges of the ponds looking for sick or dead animals, net and bag in hand. Duck-sized mounds should be investigated since some carcasses can be heavily covered in mud, and bank edges are checked for huddling individuals. For the sake of efficiency a “leap-frog” method is used in which the pair switches off driving 0.2-0.4 miles of levee with foot patrol, levee distance walk adjusted for the number of birds found in the vicinity. (One glove should be removed for driving). Garbage bags could be emptied into a shared trash-lined bin each time a crew member reached the vehicle, or carried until filled. Place no more than 25-30 birds per bag- fewer if larger birds are collected. As the nets are light, care should be taken to weigh them down while driving the levee.

## **KEY CONTACT INFORMATION**

Dead birds are placed either in the Refuge Bio freezer, in the USGS freezer in the maintenance shop or in SFBBO’s freezer at the Cannery in Alviso. Live birds can be taken to the Wildlife Center of Silicon Valley where they are picked up by wildlife rehabilitator, (Jennifer Smith as of 2004) or to Wildlife Rescue in Palo Alto.

### ***Where To Take Live Sick Birds—Rehabilitation***

The Wildlife Center of Silicon Valley                      408-929-9453  
3027 Penitencia Creek Rd.  
San Jose, CA 95132-2815

Wildlife Rescue    650-494-7283  
4000 Middlefield Road  
Building V  
Palo Alto, California 94303

### ***Where To Take Dead Birds—Temporary Storage***

Make sure all birds are bagged and marked for incineration.

Refuge Bio freezer and USGS freezer at Refuge are first choice.

SFBBO’s Freezer at the historic Alviso Cannery is 2<sup>nd</sup> choice. Call to make sure there is space in the freezer. A master lock key should get you in to the cannery. 408-946-6548.

Don’t add more than 2-3 bags at once; leave extra bags by the freezer and alert staff that they can add 1 bag per hour. If the freezer is full, see alternatives below. **DO NOT LEAVE BAGS WITH DEAD BIRDS UNATTENDED AT THE CANNERY OR THEY WILL BE TORN APART BY PREDATORS AND MAKE A HUGE MESS.**

Humane Society Silicon Valley 408-727-3383

2530 Lafayette St. (From Alviso, go south on Gold St, that turns into Lafayette after Hwy 237)  
Santa Clara, CA 95050; 408-727-3383

Open 24/7. They accept “overflow” dead birds into their cool room. As of 10/1/04, don’t service San Jose or Alviso areas, but will take birds from Sunnyvale area ponds

San Jose Animal Care and Services 408-578-7297

Monterey & Tully Roads

San Jose (south end) 408-578-7297

Services San Jose and Alviso

## **Incinerator Services—Disposal**

SFBBO uses Koefran Industries incineration service out of Sacramento. They pick up on call, bi-weekly, or more frequently if scheduled in advance. Contact Stan at 916-361-0911.

Sacramento and Colusa NWRs have an incinerator. Call the Refuge manager in advance so they can get it going and get personnel. Capacity is 150 lbs/load (and 1 load takes ~ 5hrs to incinerate). A replacement is planned that may have a higher capacity (last updated 2004).



2008 Don Edwards SF Bay NWR Botulism Survey

Observers: \_\_\_\_\_

Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time End: \_\_\_\_\_

Total Dead: \_\_\_\_\_ Total Sick: \_\_\_\_\_

Area covered (Coyote Cr Lagoon, or Pond #)	Species	Alive/Dead	Comments