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Managing Water in the West

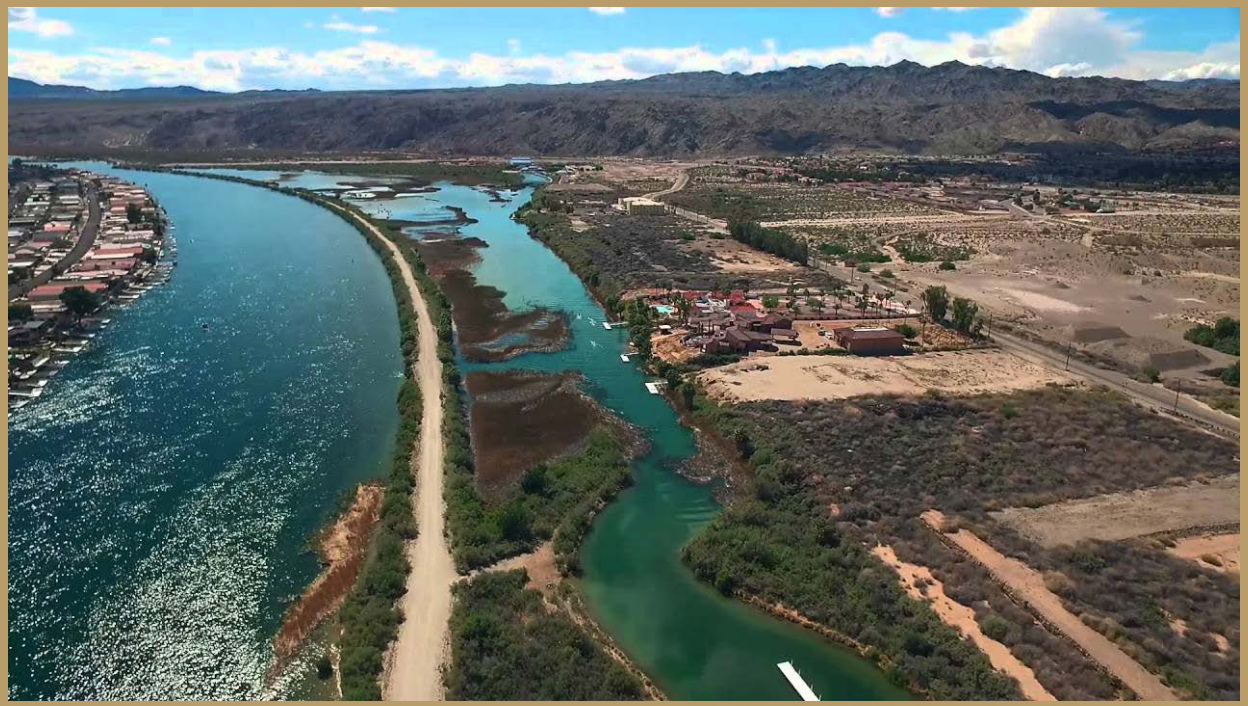
Laughlin Lagoon Avian Predation Monitoring

U.S. Department of the Interior
Bureau of Reclamation

Background

Laughlin Lagoon

- Upper end of Reach 3
- 250 acre backwater/wetland
- >14k Bonytail and Razorback stocked to date
- Utilized by a suite of avian predators
- Anecdotal observations of avian predators raised questions



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Methods

- **PIT scanner antennas**
  - **Mounted on known perching locations**
- **Motion activated cameras**
  - **Mounted on the antennas**

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Study area and manipulation

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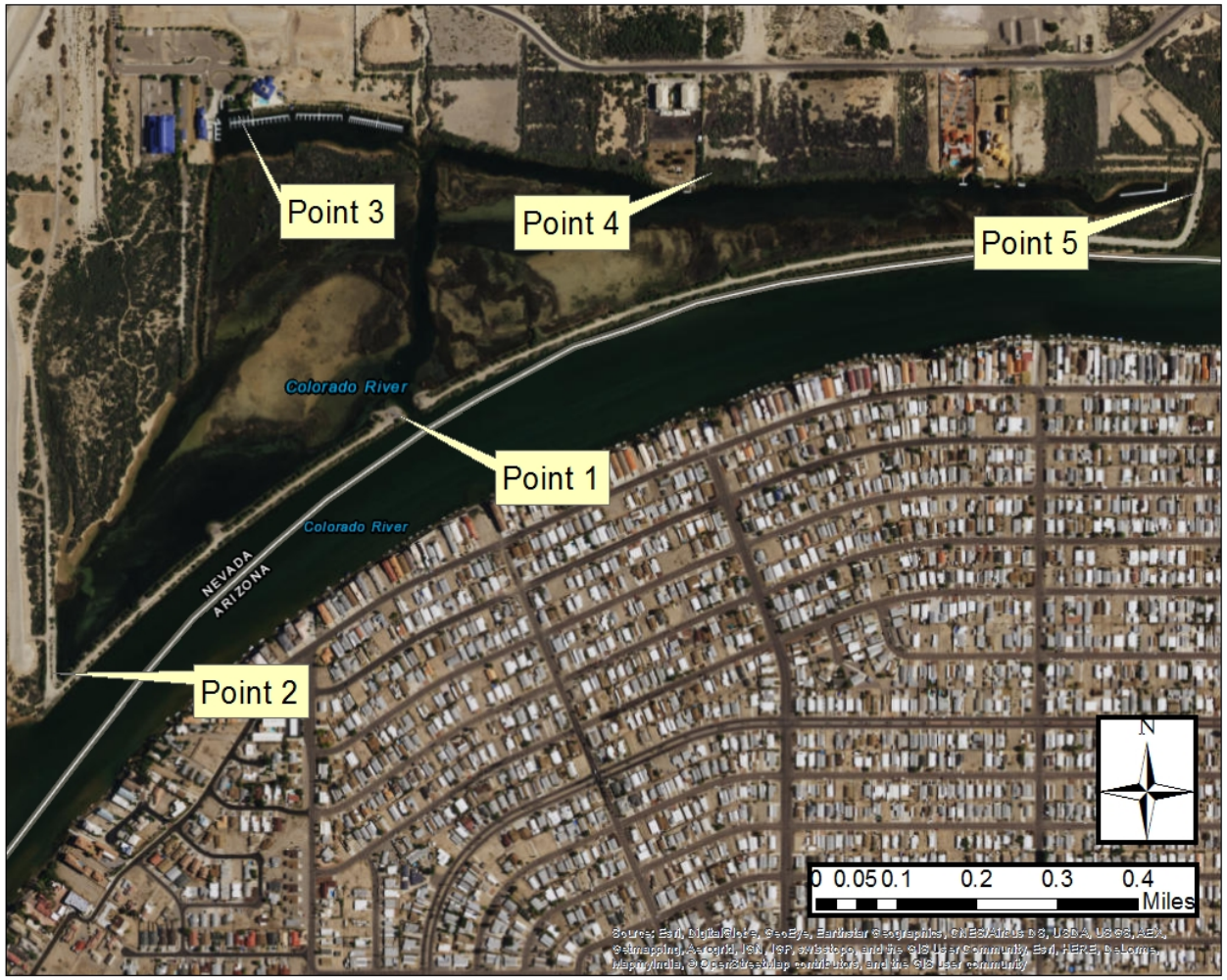
- **Point counts**
  - **5 locations**
  - **10 min each**
  - **3X/day**



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Bioenergetics (DCCO & GBHE)

(BD*DEE)/(MEC*AE)

- BD= Bird days
  - Total # birds present during each study period
- DEE= Daily energy expenditure
  - Energy required for an individual bird to live and function for one day (kj)
- MEC= Mean energy content
  - Of cyprinids at estimated weight (kj/g)
- AE= Assimilation efficiency
  - Proportion of EC actually utilized

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Results

23-09-2015	04:37	3DD.003BCB6FAB
23-09-2015	04:38	3DD.003BCB6FAB
23-09-2015	04:39	3DD.003BCB6FAB
23-09-2015	04:40	3DD.003BCB6FAB
23-09-2015	04:41	3DD.003BCB6FAB
23-09-2015	04:42	3DD.003BCB6FAB
23-09-2015	04:43	3DD.003BCB6FAB
23-09-2015	**04:44**	**3DD.003BCB6FAB**
23-09-2015	04:45	3DD.003BCB6FAB
23-09-2015	04:46	3DD.003BCB6FAB
23-09-2015	04:47	3DD.003BCB6FAB
23-09-2015	04:48	3DD.003BCB6FAB
23-09-2015	04:49	3DD.003BCB6FAB
23-09-2015	04:50	3DD.003BCB6FAB
23-09-2015	04:51	3DD.003BCB6FAB

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Results

Date	BTC Stocked	# Days scanned	Tags detected	% of stock	Cormorant	Osprey	Great Blue Heron	No Photo
December 9, 2015	947	9	24	2.5	22	1	0	1
May 17, 2016	697	13	7	1.0	5	0	1	1
December 7, 2016	1,685	12	90	5.3	72	0	11	7
May 30, 2017	852	10	0	0.0	0	0	0	0
December 5, 2017	1,200	13	10	<1.0	3	0	1	6

- **Cormorants were largest consumers of BTC**
- **% Predated conservative**
  - **Not all birds utilized perches**
  - **GBHE too tall?**
  - **OSPR often utilize nearby power poles**

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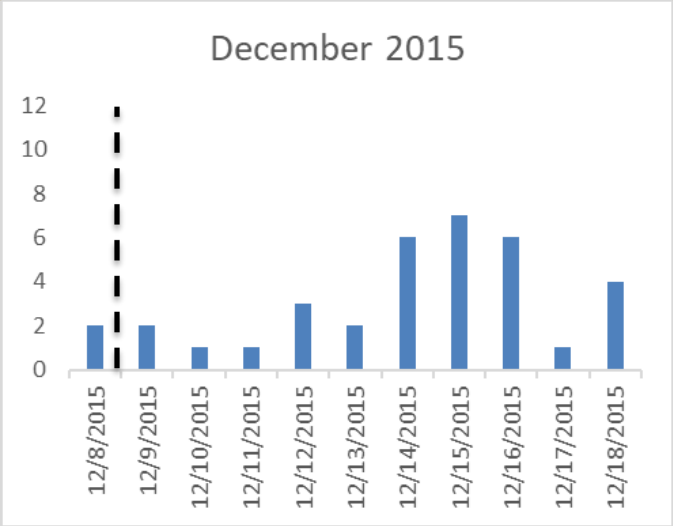
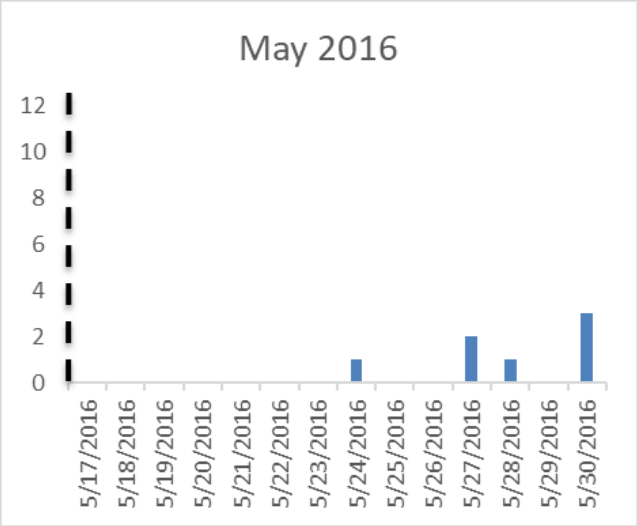
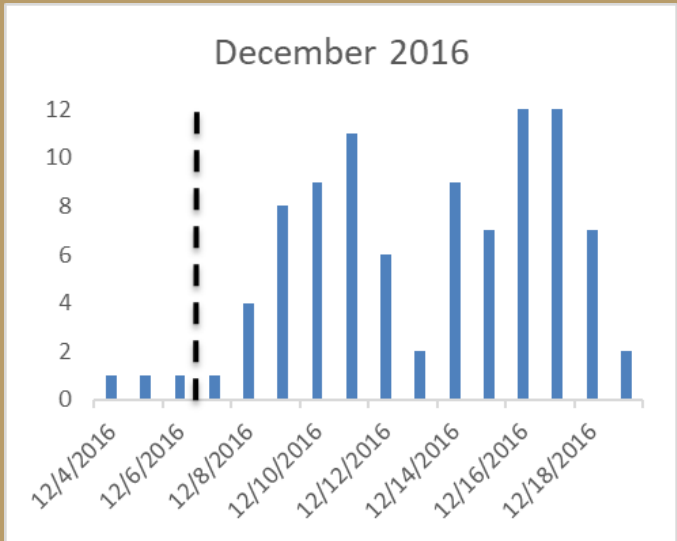
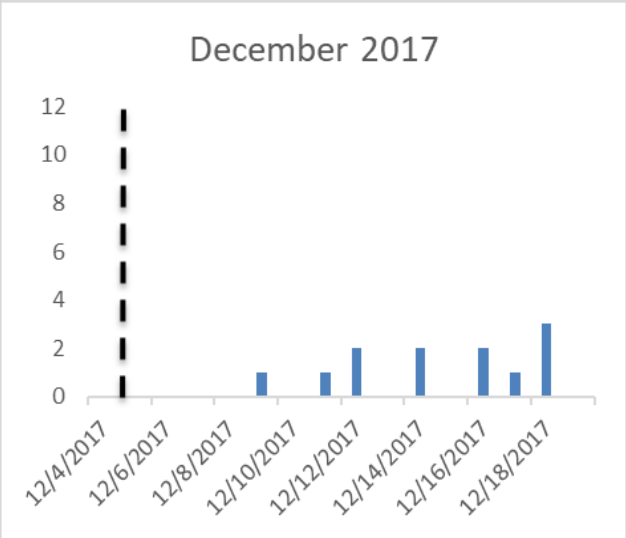
Individual PIT detections/day









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Predation from prior stockings

- December 2015
  - 4 BTC stocked 9/2015
  - 5 RASU stocked 10/2015
- December 2016
  - 3 BTC stocked 5/2016 (6 months survival)
- May 2017
  - 4 BTC stocked 4/2017

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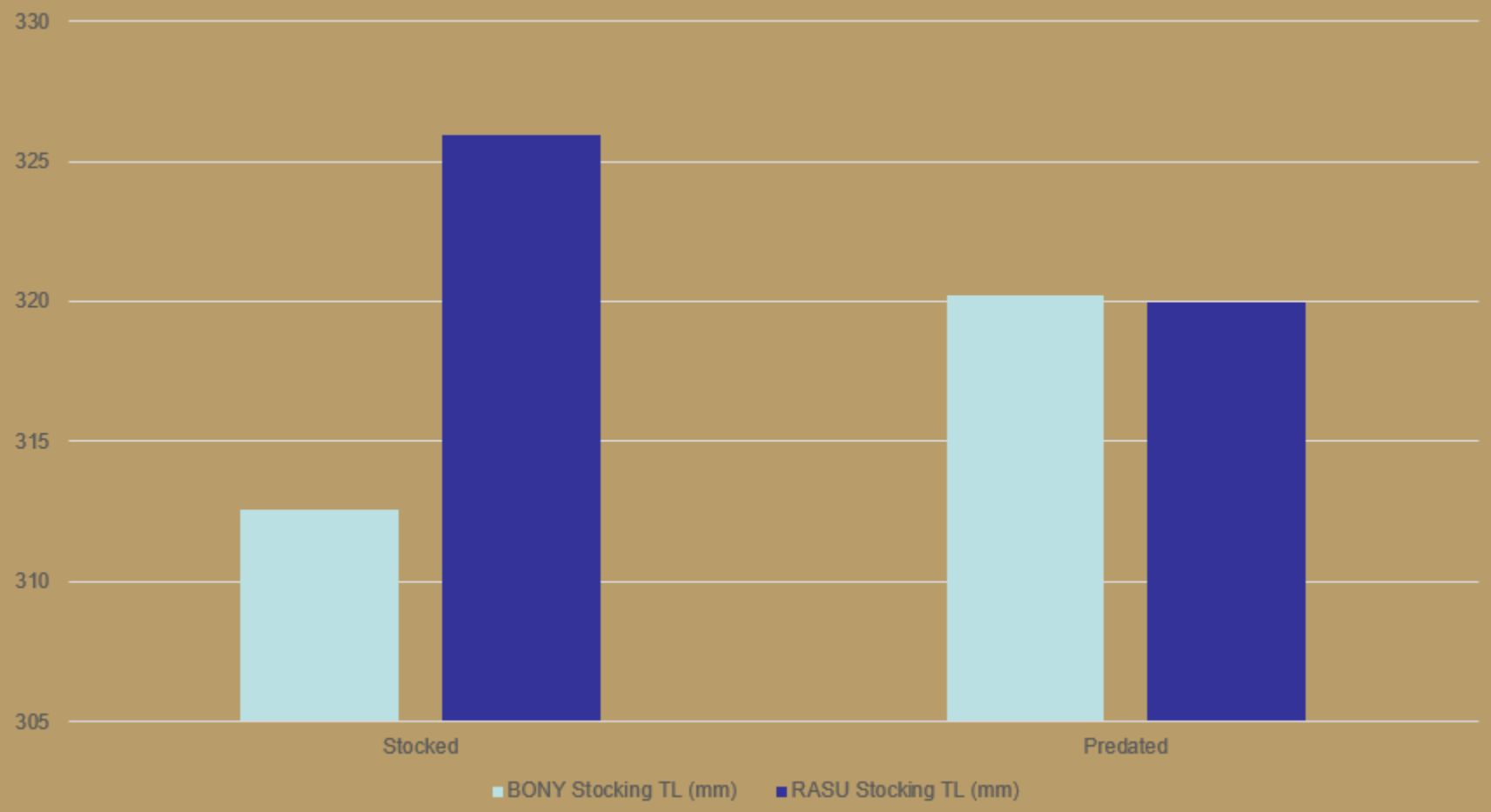
Average size at stocking for BTC and RASU vs. those predated



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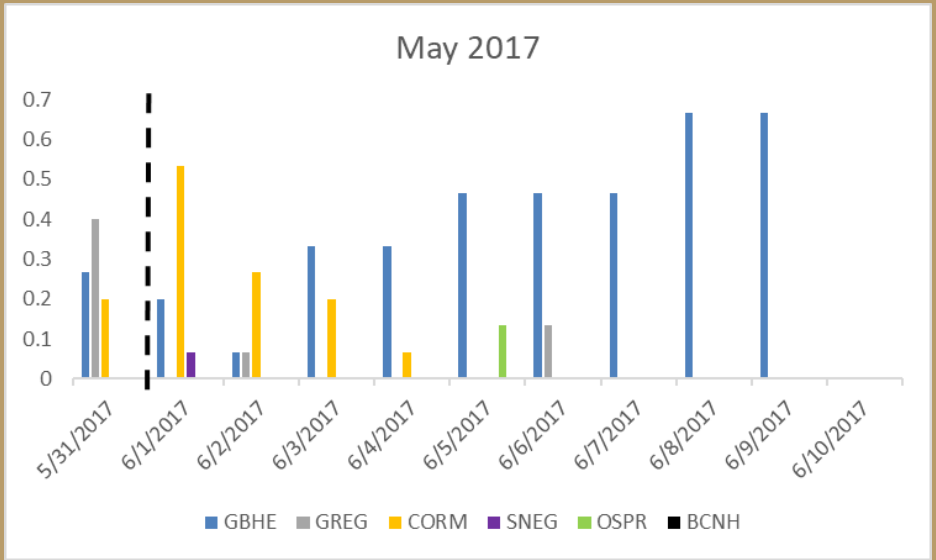
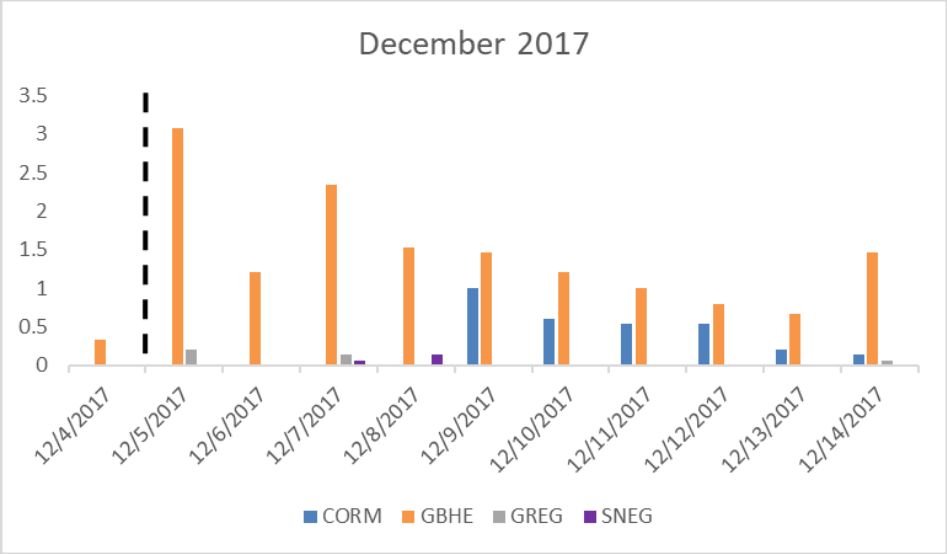
Avian Predator Densities

- Densities of predators difficult to correlate with stocking events
- Can change quick with large flocks of COMO





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Predation Estimates BTC

Study Period	Bird spp	Flyovers	Bird-days	Total DEE (kj)	Est. Mean Take	95% CI	% of Release
12/7 - 12/16/16	DCCO	Excluded	285	746985	497	485-509	29%
BONY released		Included	396	1037916	690	677-704	41%
1685	GBHE	Excluded	61	82411	55	51-59	3%
Median TL: 348 mm		Included	63	85113	57	53-61	3%
5/31 - 6/9/17	DCCO	Excluded	20	52420	58	57-59	7%
BONY released		Included	20		58	57-59	7%
852	GBHE	Excluded	59	51625	57	56-58	7%
Median TL: 300 mm		Included	59		57	56-58	7%
12/5 - 12/14/17	DCCO	Excluded	35	91735	84	80-90	7%
BONY released		Included	41	107461	99	94-104	8%
1200	GBHE	Excluded	178	199047	183	176-191	15%
Median TL: 304 mm		Included	220	246013	226	218-235	19%

[1]DEE is kj/bird/day based on a 5 lb (2,668 g) bird, adjusted for assimilation efficiency (AE). DEE for DCCO is 2621 for all study periods. DEE for GBHE varies by the average temperature during the study period: 1351 for December 2016, 875 for May-June 2017, and 1118 for December 2017.

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December 12, 2017 – 7 days post stock

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Summary

Date	Observed Predated (Scanner and Camera)	Potential Predated (DCCO + GBHE)
12/2016	5.3% (12 days)	32% (10 days)
5/2017	0% (10 days)	14% (10 days)
12/2017	0.8% (13 days)	22% (10 days)

- Actual number is probably somewhere in between
- If fish are slow learners they may not last long
  - Disperse fish?
- Difficult to predict when bird densities will be low
  - Less flocks/migrants in spring?
- Interesting lag in predation events when natives not already being predated from previous stocks
  - Don’t stagger stocking events?

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Thanks!

MSCP Staff,
Nathan Rudd
&
Julia Mueller
(NPS retired)

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