

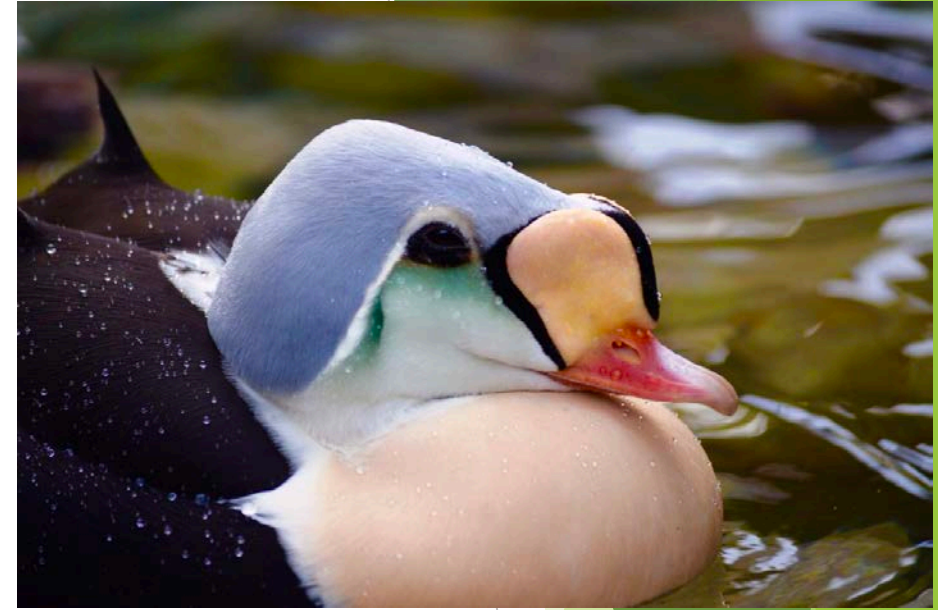


SETTING UP FOR WATERFOWL SUCCESS AT PINOLA CONSERVANCY

Jacob Kraemer, Aviary Director



- Founded in 2009 as a private aviary
- Achieved AZA Accredited Related Status in 2018
- Many (many) years of experience in aviculture
- Ample opportunities to learn, to succeed...and to fail!
- Not open to the public, very limited visitation





- Species total-245
- Pinola's core is waterfowl
- Current total waterfowl species: 130
- Historical success: 134 species of waterfowl reared at Pinola Conservancy





Aviary Design

- Over 60 aviaries, enclosures, and facilities
- All community aviaries
- Mostly geographically specific
- Most centered around waterfowl



*Scope of Large Free Flight Aviary 150' x 140' x 18'



Aviary Design



*Montane forest habitat



Aviary Design



*Mediterranean scrubland habitat



Aviary Design



*Bog habitat



Aviary Design



*Copulation pool



Aviary Design



*Walk-through Aviary South American habitat



Aviary Design



*Walk-through Aviary North American habitat



Aviary Design



*Walk-through pathway between continents



Aviary Design



*Stream Aviary 150' x 45' x 12', divided into 6 enclosures



Aviary Design



*Stream Aviary diving pool



Aviary Design

*Stream Aviary individual run for flying steamer duck





Aviary Design



*Stream Aviary smaller 30' x 45' run for KIEI and LTDU



Aviary Design



*Bay Aviary built summer 2022



Aviary Design



*Bay Aviary



Aviary Design





Aviary Design





Aviary Design



*Smaller partition aviary for green pygmy goose and others



*Goose Lawn-open top lawn



Aviary Design



*Goose Lawn copulation pools added 2023



Aviary Design

Community aviaries:

- Big enrichment value
- Reassurance for better breeding
- Natural approach





Genetic Diversity and Mate Selection

Imports and Exports for genetic sustainability

- PC has commissioned numerous imports and exports since 2010 to and from parts of EU, Africa, and Asia



Mate Selection

- Every attempt made to keep pairs as genetically diverse as possible/known
- Strive to allow birds to choose their own mates whenever possible





Feeding and Enrichment

- Extruded pellets as the main diet
- Pellet protein content changes seasonally for some species
- Live and frozen items offered daily
- Grains offered year-round and seasonally
- Greens offered daily





Feeding and Enrichment

Pinola Sea Duck Pellet

- Pellet of our own design and use, geared towards nutritional needs of sea ducks and ducklings
- Main ingredients: Fish meal, krill meal, shrimp meal, krill oil, spirulina meal
- 45% protein
- Extruded
- High palatability
- Minimal waste
- Perfect for shorebirds and others with higher protein dietary needs
- Made in starter and adult size



*Larger size



*Starter size



Feeding and Enrichment

Pinola Sea Duck Pellet



*Starter size



*Larger size



*Both



Feeding and Enrichment

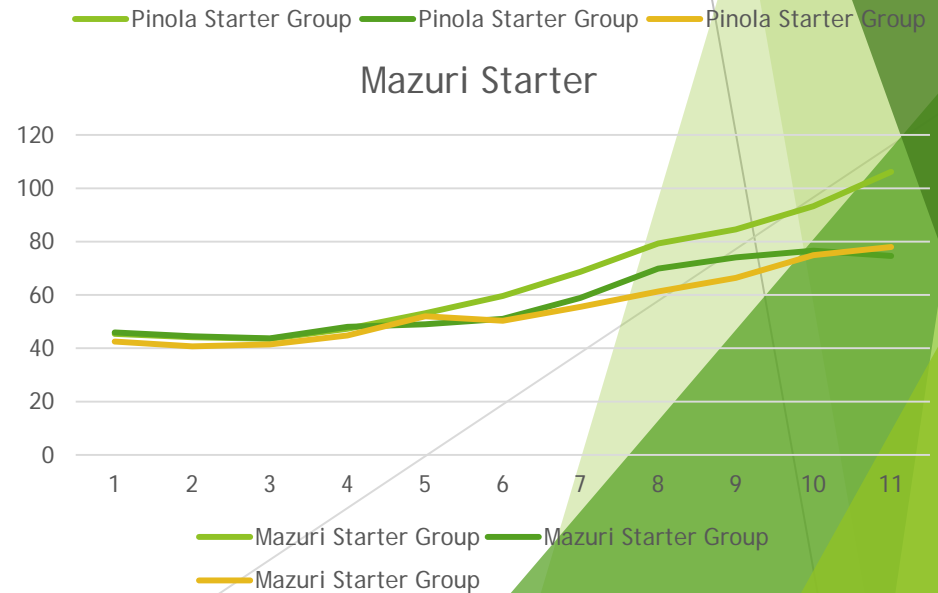
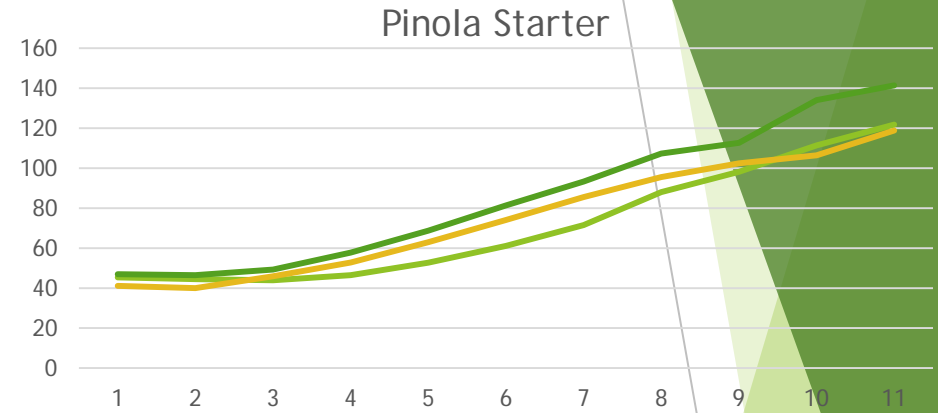
Pinola Sea Duck Pellet Growth Comparisons

Duckling Feed Trial July 2022

Species: Red-breasted Merganser

Pinola Starter Group			
Age (days)	Pink	Yellow	Blue
1	45.4	47	41.1
2	44.5	46.5	40
3	43.9	49.3	45.9
4	46.5	57.8	52.8
5	52.7	68.7	63
6	61.1	81.4	74.1
7	71.5	93.3	85.5
8	88	107.3	95.5
9	98.2	112.7	102.4
10	111.4	134	106.4
11	121.8	141.4	118.8
17	226.5	283	232

Mazuri Starter Group			
Age (days)	Orange	Yellow	Blue
1	45.4	45.9	42.5
2	44.1	44.5	40.7
3	43.5	43.7	41.4
4	47.3	48	44.8
5	53.1	49	52
6	59.6	51	50.3
7	68.7	58.9	55.5
8	79.3	69.9	61.3
9	84.6	74.1	66.4
10	93.3	76.6	74.9
11	106.2	74.6	78
17	239	165	80





Feeding and Enrichment

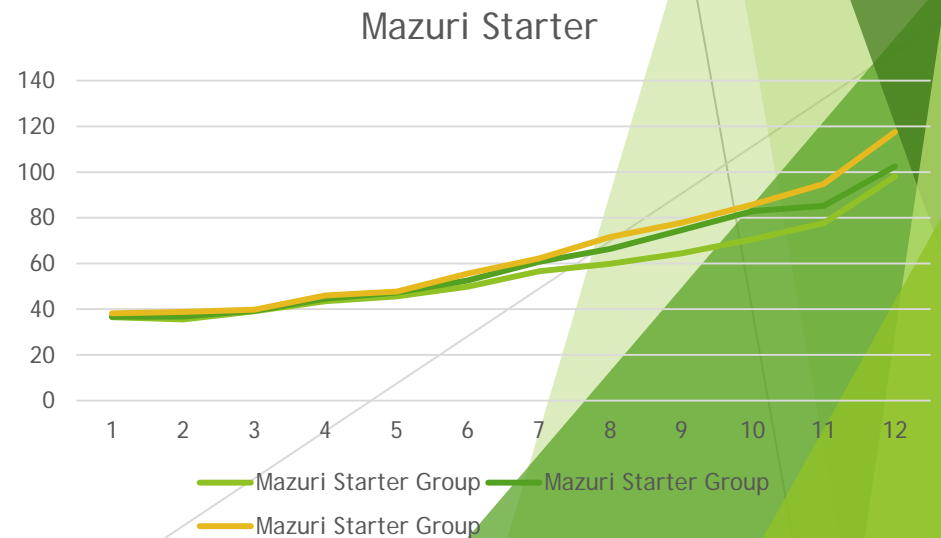
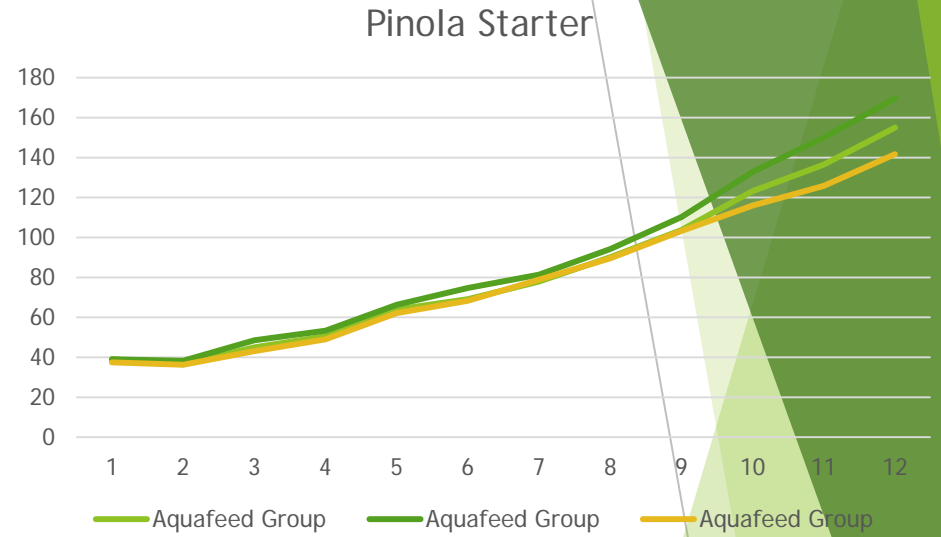
Pinola Sea Duck Pellet Growth Comparisons

Duckling Feed Trial July 2022

Species: Mallard

Pinola Starter Group			
Age (days)	Blue/Yellow	Blue/Orange	Blue/Blue
1	39.1	39	37.5
2	36.5	38.3	36.3
3	45	48.5	43.1
4	50.5	53.3	49
5	64	66.3	62.1
6	69.1	74.7	68.3
7	77.9	81.4	78.9
8	90.1	94.2	89.5
9	103.7	110.2	103.2
10	123.2	132.8	116
11	136.5	150	125.8
12	155	169.6	141.7

Mazuri Starter Group			
Age (days)	Blue/Yellow	Blue/Pink	Orange
1	36.5	36.7	38.2
2	35.5	36.8	38.8
3	39.1	39.3	39.8
4	43.5	44.6	46
5	45.6	47.3	47.7
6	49.9	52.6	55.6
7	56.6	60.7	62.2
8	59.9	66.4	71.6
9	64.4	74.6	77.8
10	70.6	82.9	85.8
11	77.7	85.2	94.8
12	98.1	102.5	117.6





Feeding and Enrichment

- Encourage natural feeding behaviors
- Strive to feed on or near water
- Helps to prevent very common ailments (pododermatitis)
- If given the choice, almost always prefer to feed this way





Feeding and Enrichment

Demand feeder (Peck-o-Matic)

- Encourage natural feeding behaviors (make them work for it)
- Birds absolutely prefer this over any other presentation of food
- Ample enrichment
- Helps in aiding to prevent common ailments





Feeding and Enrichment





Feeding and Enrichment



*Deer feeder



*Swim to table



Feeding and Enrichment

Green offerings



*Sprouted seeds (fodder)

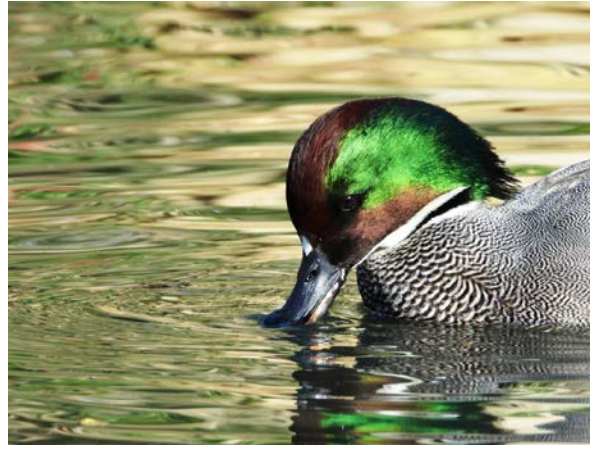


*Water lilies

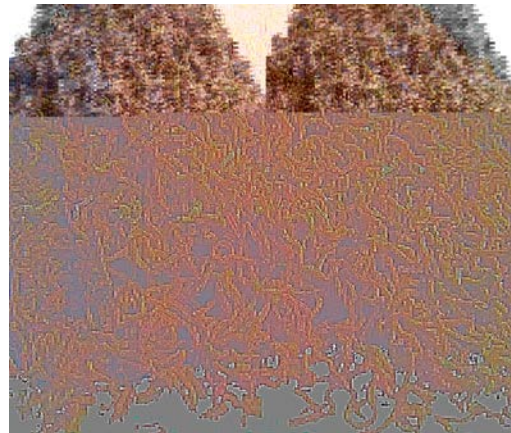


Feeding and Enrichment

*Freeze-dried Invertebrates



*Gammarus



*Bloodworms



Feeding and Enrichment

Seafood items



*Mussels

*Capelin, krill, silversides, mussels



Feeding and Enrichment

Seafood items



*Surf Scoter eating mussel



*Common eider eating fish



Feeding and Enrichment

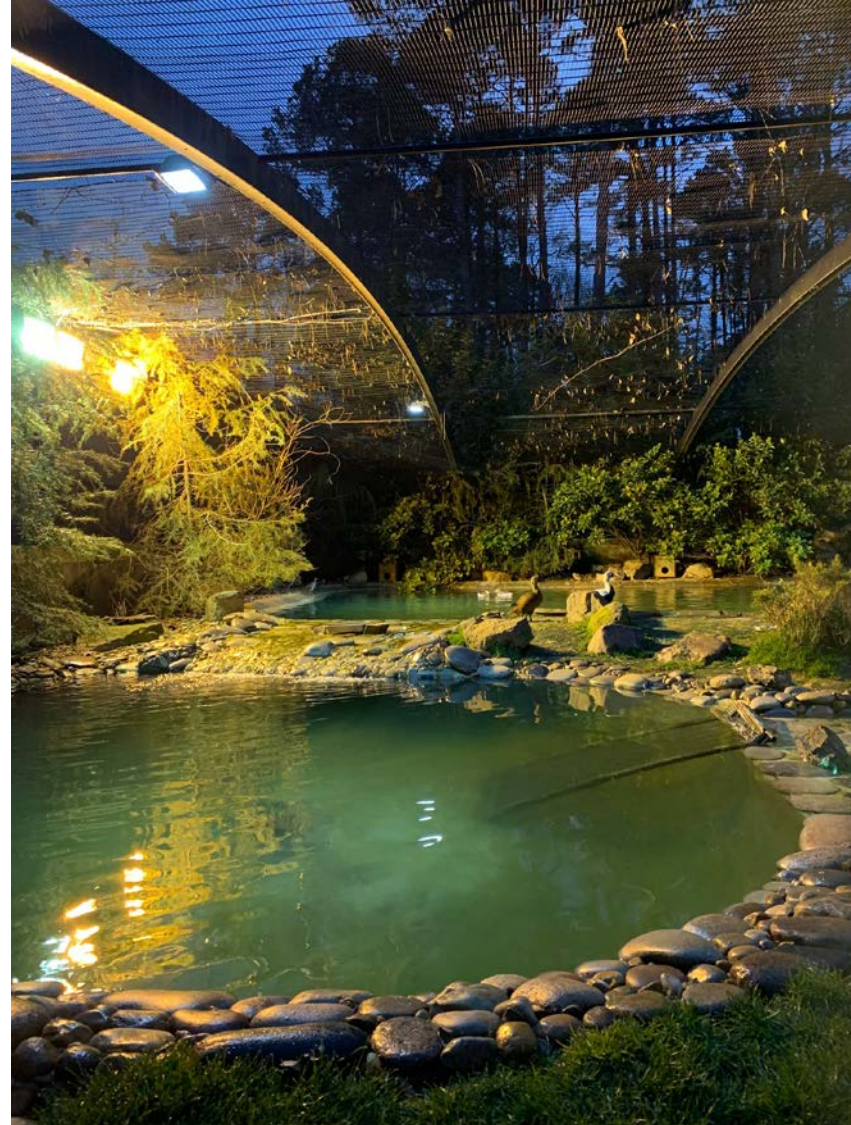
Diving for mussels:





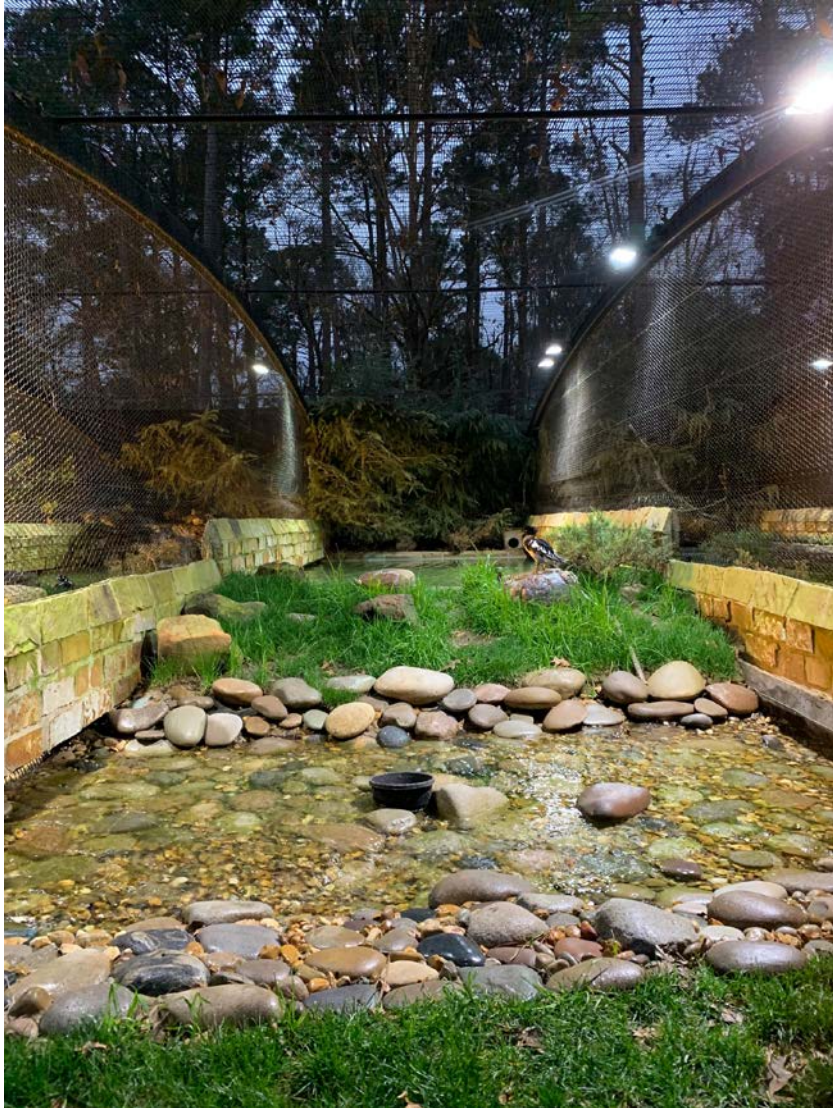
Nesting: inducing and encouraging

- Heavy use of photoperiod manipulation
- Has worked tremendously well for us
- Not without issues



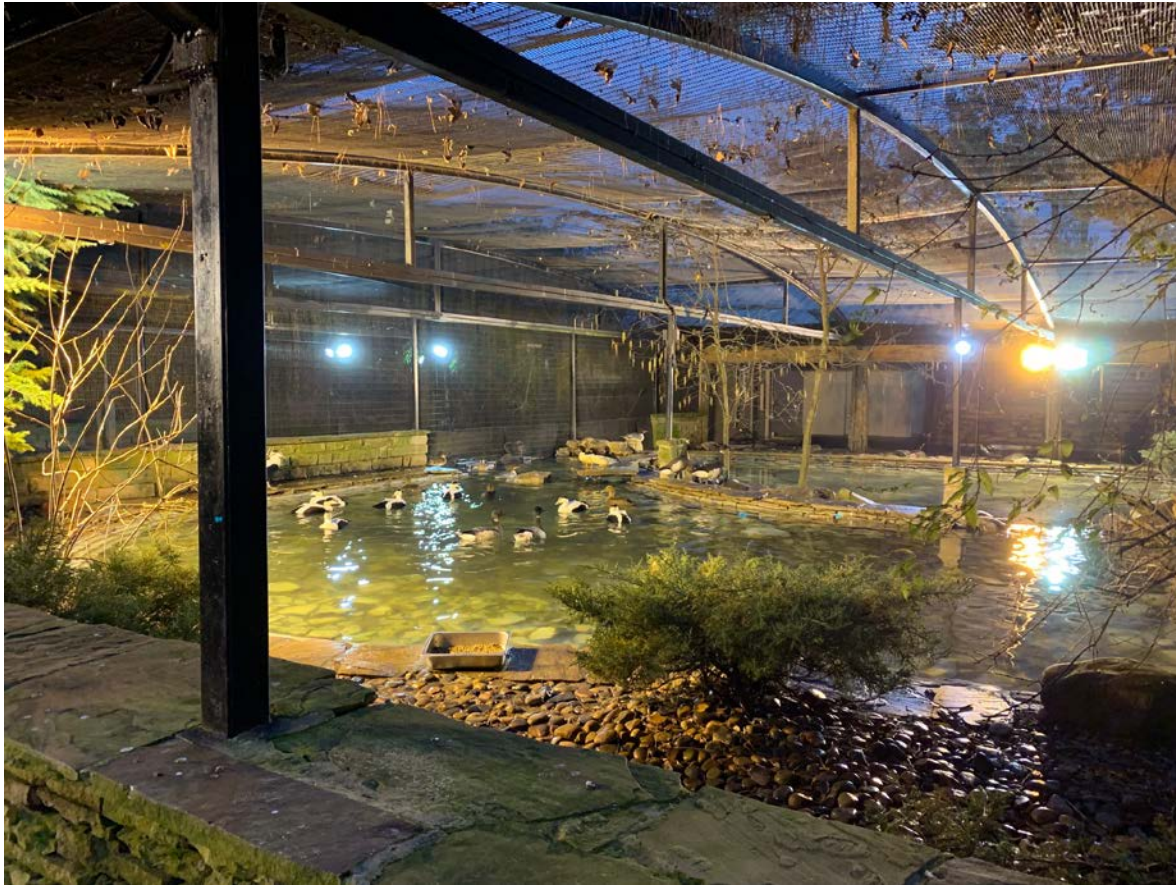


Nesting: inducing and encouraging





Nesting: inducing and encouraging





Nesting: inducing and encouraging

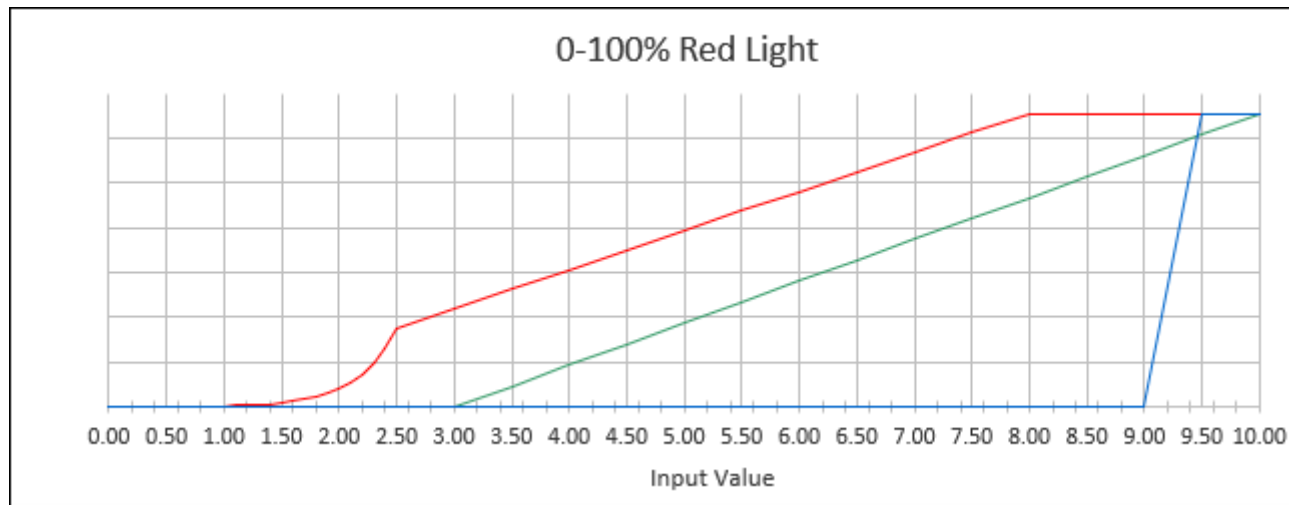
SHV Dates On	On/Off	Total Hours	Arctic Location	Arctic Date
1-Jan	6:00-7:00	11	Still in Louisiana	
20-Jan	5:30-7:00	11.5	Still in Louisiana	
10-Feb	5:00-7:00	12	Still in Louisiana	27-Mar
1-Mar	3:50-6:30	13.5	North Dakota (arrival at mid-continent staging)	15-Apr
1-Apr	3:00-6:30	15	North Dakota (departure from staging)	1-May
9-Apr	1:30-6:30	16	Alberta, CAN (arrival at boreal staging)	8-May
18-Apr	1:00-6:30	17	Alberta, CAN (departure from boreal staging)	15-May
25-Apr	23:00-6:30	18	Arrival at arctic staging	23-May
1-May	19:30-6:30	24	High arctic breeding areas	1-Jun

SHV Dates On	On/Off	Total Hours	Arctic Location	Arctic Date
20-Jan	5:30-7:00	12	Nome, AK	20-Mar
5-Feb	4:00-7:30	14	Nome, AK	5-Apr
12-Feb	2:00-7:00	16	Nome, AK	12-Apr
20-Feb	00:00-7:00	18	Barrow, AK	20-Apr
1-Mar	22:15-7:00	20	Barrow, AK	1-May
8-Mar	20:15-7:00	22	Barrow, AK	8-May
17-Mar	18:00-7:00	24	Barrow AK	17-May



Nesting: inducing and encouraging

New lighting system being trialed on European passerines from Once Innovations/Signify. Graph courtesy of Gabrielle House, Ph.D.



- Red light essential to stimulating nesting behavior in birds
- High concentration of red light at dusk and dawn periods will “bookmark” circadian rhythm
- The dimming curve provides a very full spectrum light providing a high color rendering index





Nesting: inducing and encouraging....so many options to choose from!

- Literally, so many options
- Natural and artificial both work great!
- Some work better for others
- Get creative, the birds won't judge you (I might)
- Think like the birds
- Listen to the birds





Nesting: inducing and encouraging



Classic porch-style box



Nesting: inducing and encouraging



*Classic porch-style box



Nesting: inducing and encouraging



*Get creative! Nest burrow hill



Nesting: inducing and encouraging



Natural logs are excellent choices



Nesting: inducing and encouraging



*Green Pygmy Goose natural log nest options



Nesting: inducing and encouraging



Natural logs are excellent choices



Nesting: inducing and encouraging



*Nature

Look to nature!



*Pinola



Nesting: inducing and encouraging



Natural logs are excellent choices



Nesting: inducing and encouraging



*Classic cavity-style box



Nesting: inducing and encouraging



Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging



*Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging



*Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging



*Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging



*Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging



*Natural nests are always great, some species absolutely favor it



Nesting: inducing and encouraging





Nesting: inducing and encouraging

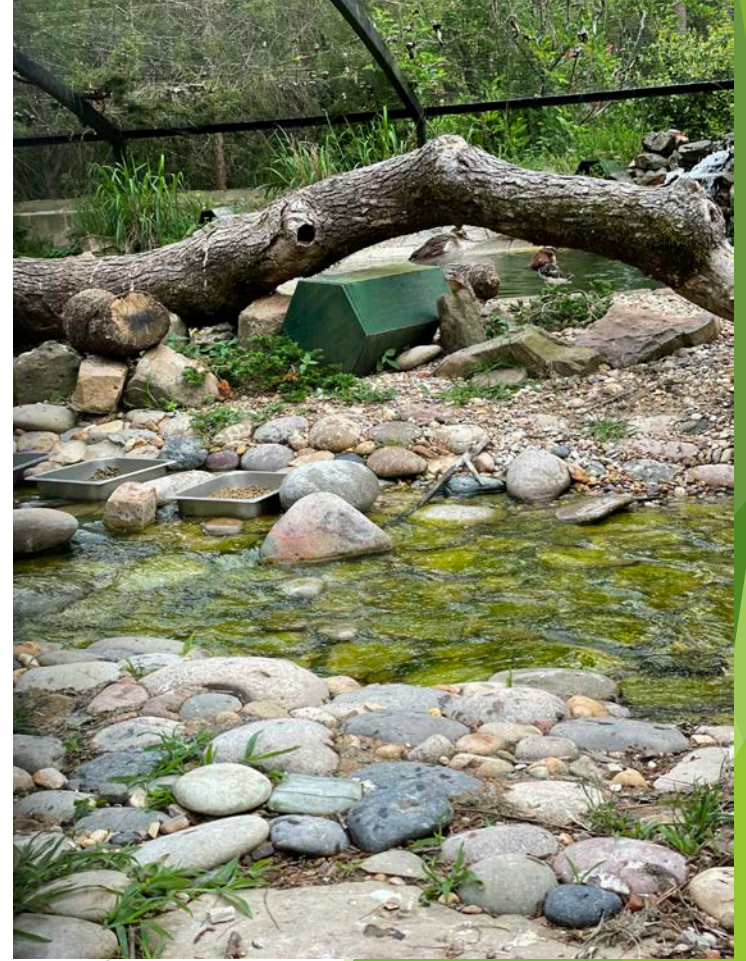
Wildfowl and Wetlands Trust hexagon ground box

- Implemented in 2020 after 2019 visit to WWT Arundel
- One of our most successful boxes to date
- 40 different species have successfully used this style at PC
- Average dimensions: 12" w-13" h-20" d





Nesting: inducing and encouraging





Nesting: inducing and encouraging

Long-tailed Duck





Nesting: inducing and encouraging

American Black Duck



Cape Shelduck



Mottled Duck



Grey Peacock Pheasant



Red-crested Pochard



Orinoco Goose



Lesser Scaup



Harlequin Duck





Incubation and rearing

- Artificial incubation and hand-rearing are the primary means
- Will allow parent incubation and rearing when able and/or is necessary





Incubation and rearing



*Heka Brut from Germany



*Hemel-Lundi from Germany



*Hemel-Lundi hatcher from Germany



Incubation and rearing



*R-com incubators



*R-com Maru hatcher



Incubation and rearing



*Typical 1st stage wet brooder set-up



*Typical 2nd stage wet brooder set-up



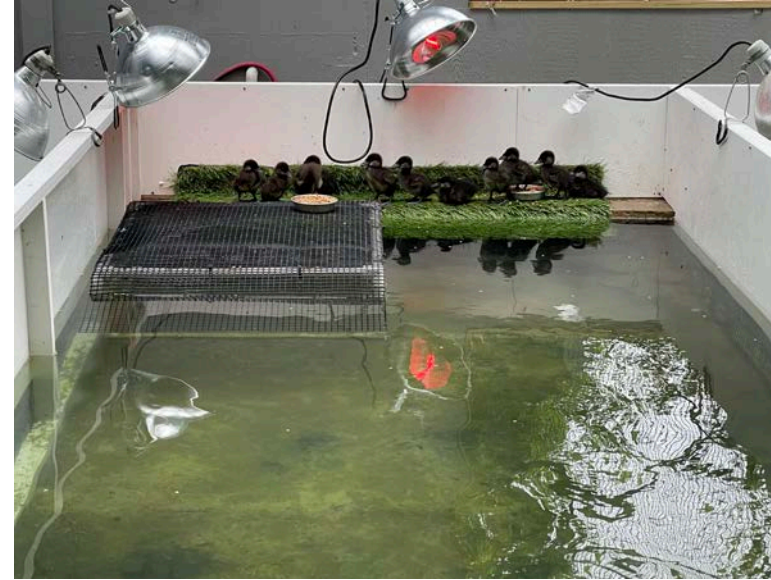
*Food presentation example



Incubation and rearing

Sea duck brooder

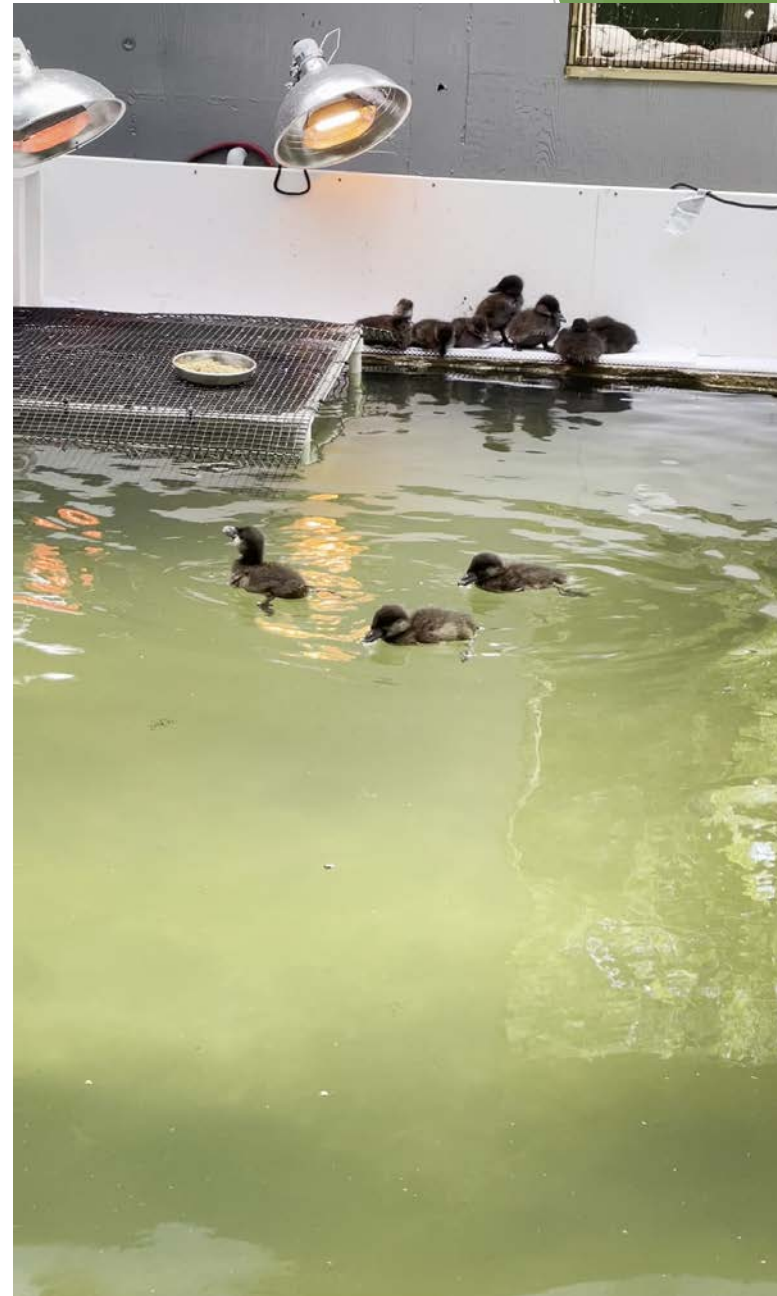
- Implemented in 2020
- Very large space, mostly water with very little loafing area
- Makes the ducklings be ducklings
- Better overall behavior and growth
- Exposure to open air and surrounding aviaries
- Exposure to beneficial UV rays via UV penetrable paneling on roof



*Pictured: not a sea duck



Incubation and rearing



*Surf Scoter in Sea duck brooder



More sage advice....

- Visit other places
- Take advantage of professional development opportunities (Pinola, Sylvan Heights, keeper swaps)
- Lift, borrow, steal ideas! It has mostly all been done before, anyways!
- Study natural habitats and behaviors and let the birds guide you
- Get creative and think outside the box
- READ! Tons of literature out there, wild and captive, with most of the best stuff written long before we existed. (Delacour, Phillips, Todd, HBW.)
- Do not waste your mistakes
- Be passionate. Success will find you!





More sage advice....



Jurong Bird Park: Singapore



Walsrode Bird Park: Germany



More sage advice....



Sylvan Heights Waterfowl: North Carolina



More sage advice....



Dry Creek Waterfowl: Washington



More sage advice....



WWT, England 2019



More sage advice....



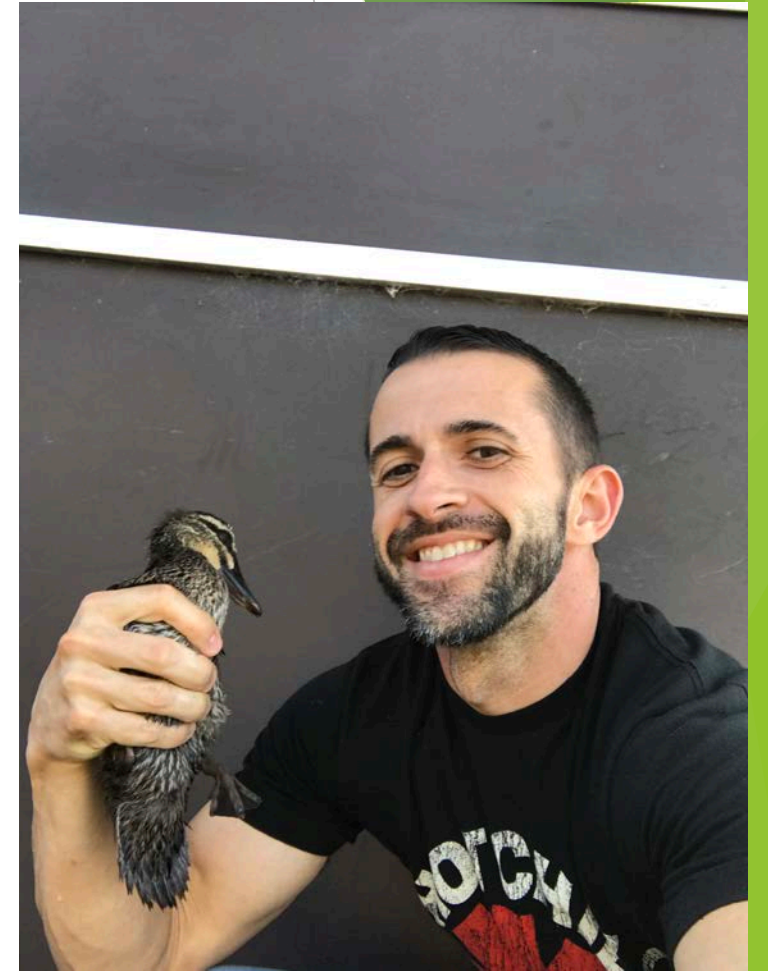
Private collection in Belgium 2022



More sage advice....

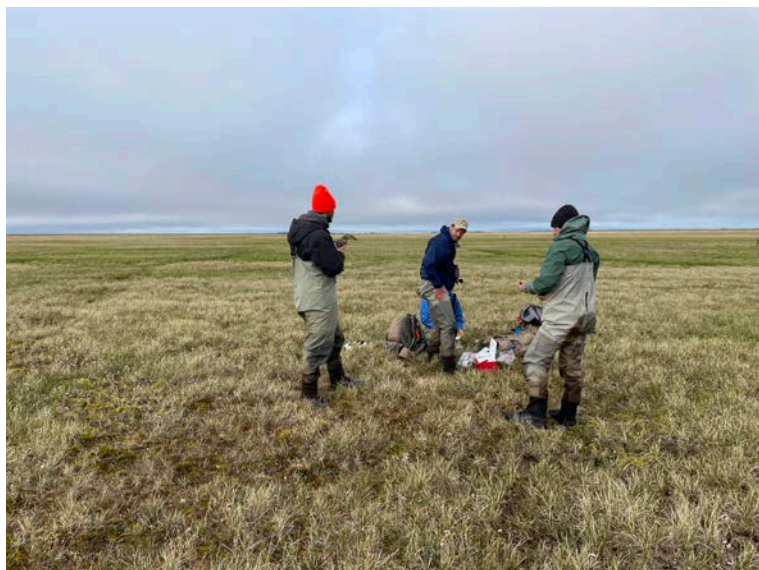


Perth, Australia 2017





More sage advice....



Barrow, Alaska 2022





More sage advice....



Kraemer, Louisiana





Glimpse into the future

Sea duck aviary expansion to be completed Summer 2023





Thank you!!

