Behavioral Monitoring of a Flock of Lesser Flamingos Surrounding a Temporary Transfer to another Exhibit

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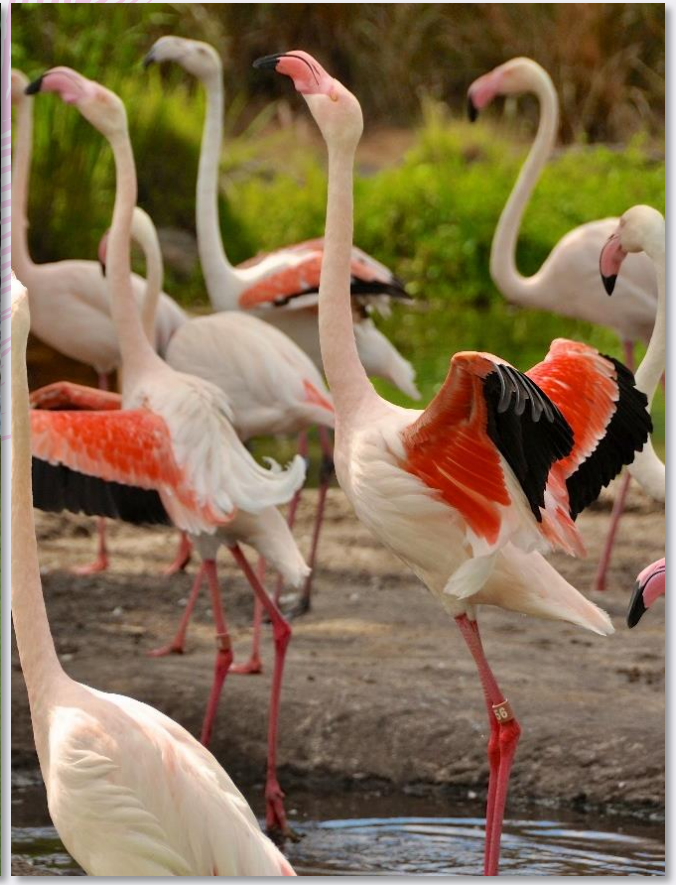
speaker notes in italics

Background

- Construction at Tree of Life (TOL)
  - Lessers temporarily moved to greater flamingo exhibit at Disney's Animal Kingdom® (DAK) Lodge
- Behavioral monitoring initiated for welfare assessment

Questions and Opportunities



- **Welfare**: How does the move/ integrating species affect behavior of both species?
- **Welfare/Reproductive**: Larger flocks are often more successful.
  - Will integrating two species have this effect?
- **Reproductive**: Can we predict reproductive events using behavior cues and work with keepers to develop management strategies?

Our Flocks

Lesser Flamingos (11.7)

Greater Flamingos (~18.21)

Welfare Monitoring Strategy: Behavioral Assessment

June 2014: Lessers moved to DAK Lodge

Nov 2016: Lessers returned to TOL

Nov 2016 – present: Continued TOL data collection

Pre-move

During Integration at DAK Lodge

After Lesser Return to TOL

June 2014 – Nov 2016: Greaters and Lessers housed at DAK Lodge

Nov 2017: End of DAK Lodge data collection

Data Collection

- **Consistent** methods across each period
- 30 min. observations
  - 3-4x per week at 10:00am (+/- 30 min.)
- All-occurrences of **social/ reproductive behaviors**
- Scans for **space use** and **proximity**

All Occurrence: Social

Head Flagging

Marching

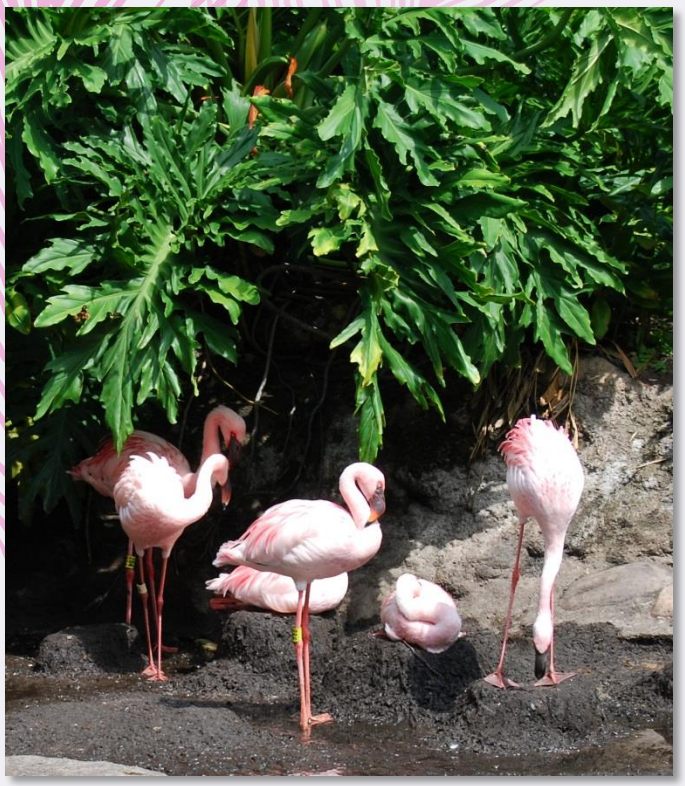
Wing Salute

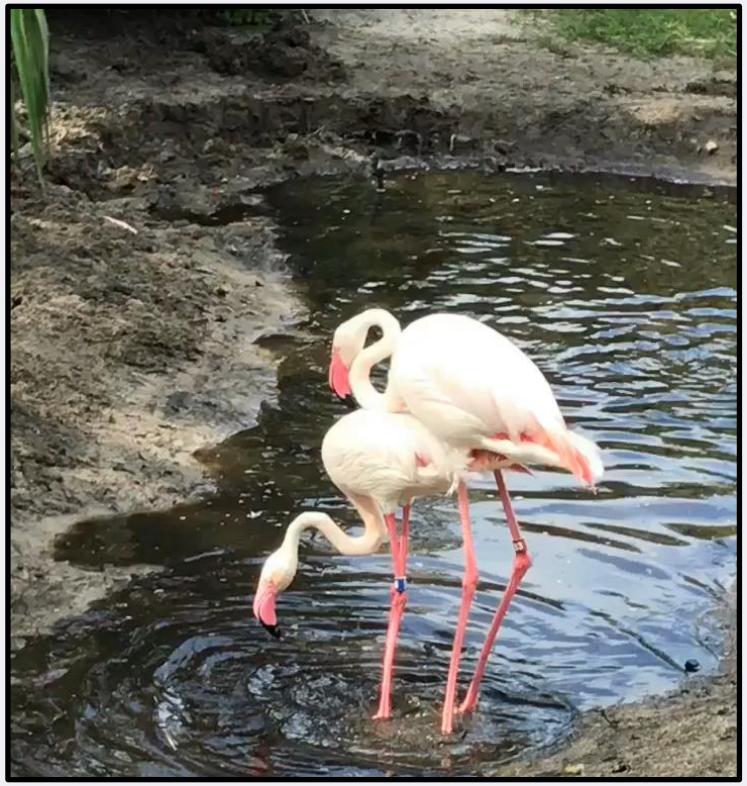
Inverted Wing Salute

Twist-Preen

All Occurrence: Reproductive

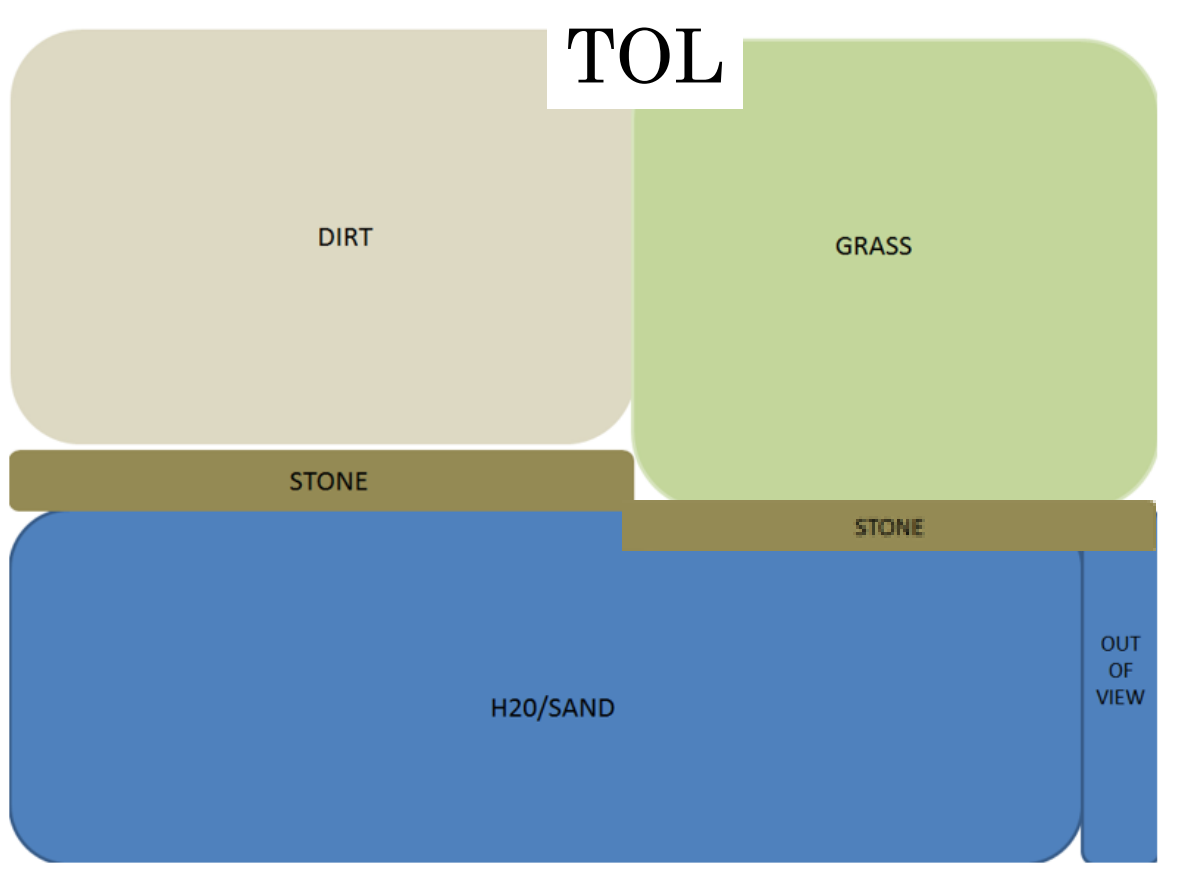
Nest Building Nest Sitting Pair Walk Copulation Attempt

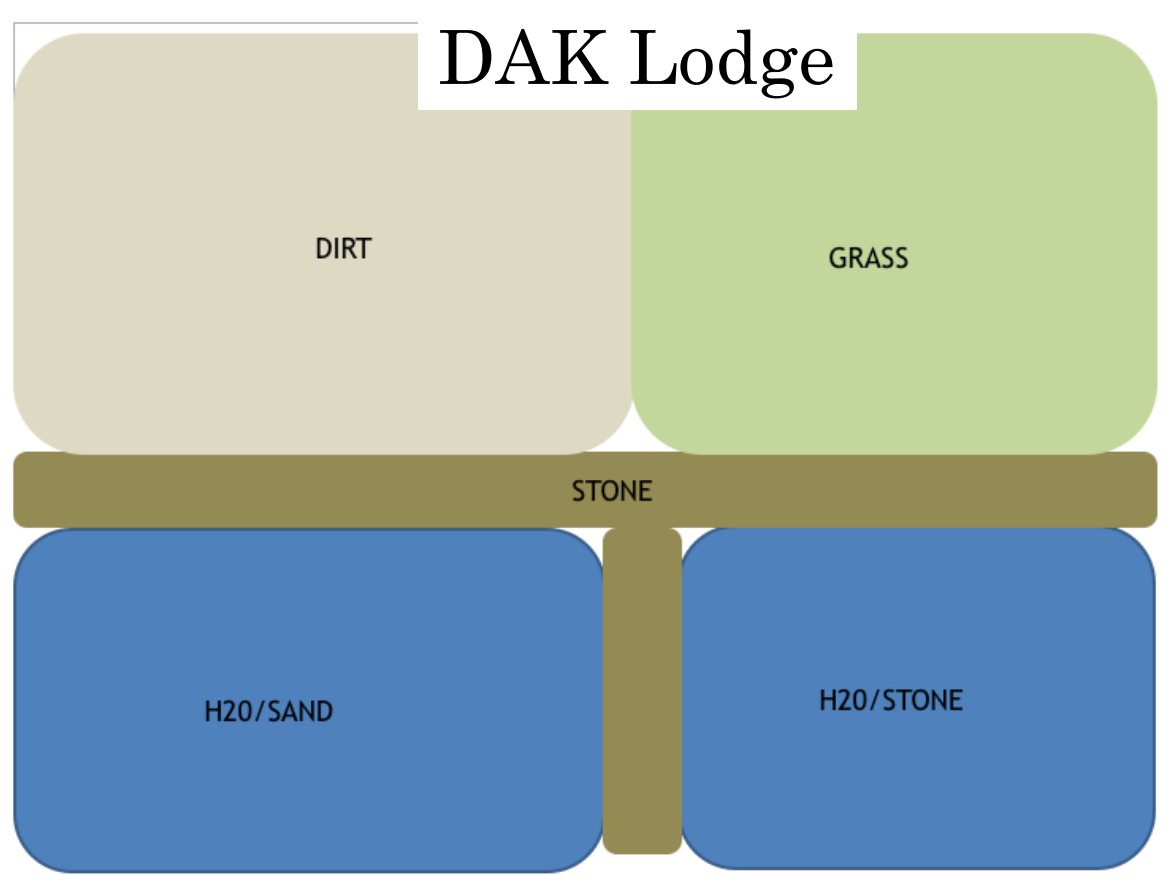




Talk about the substrate quality in addition to shared space use

Space Use

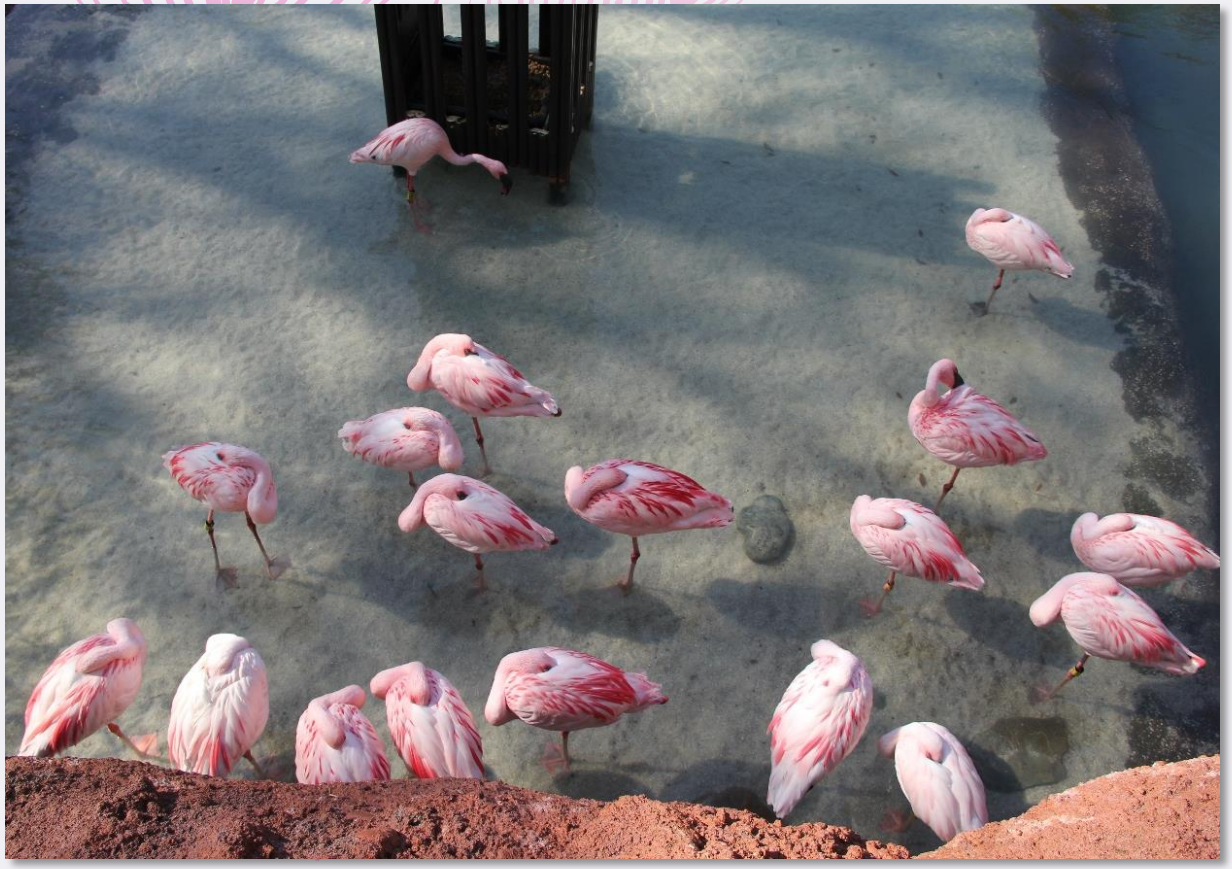




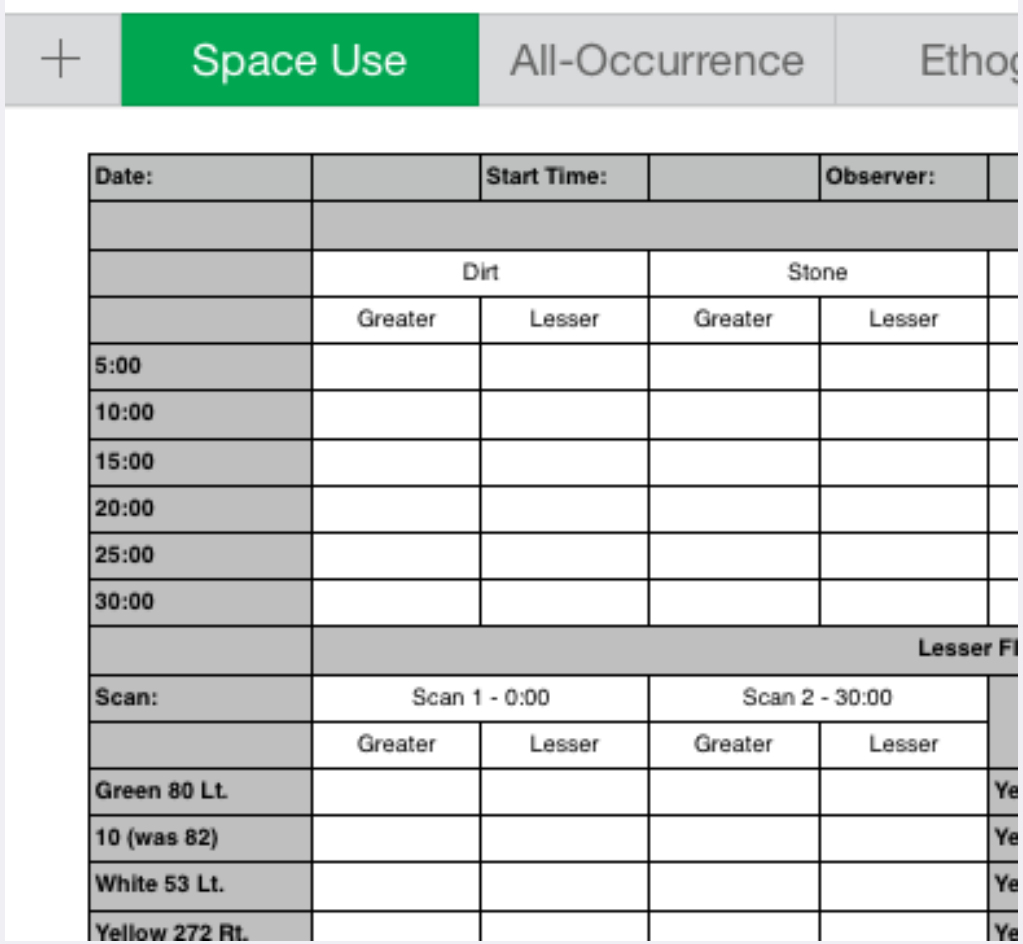
Space Use

Measure of group cohesion in
Lessers and species integration

Proximity

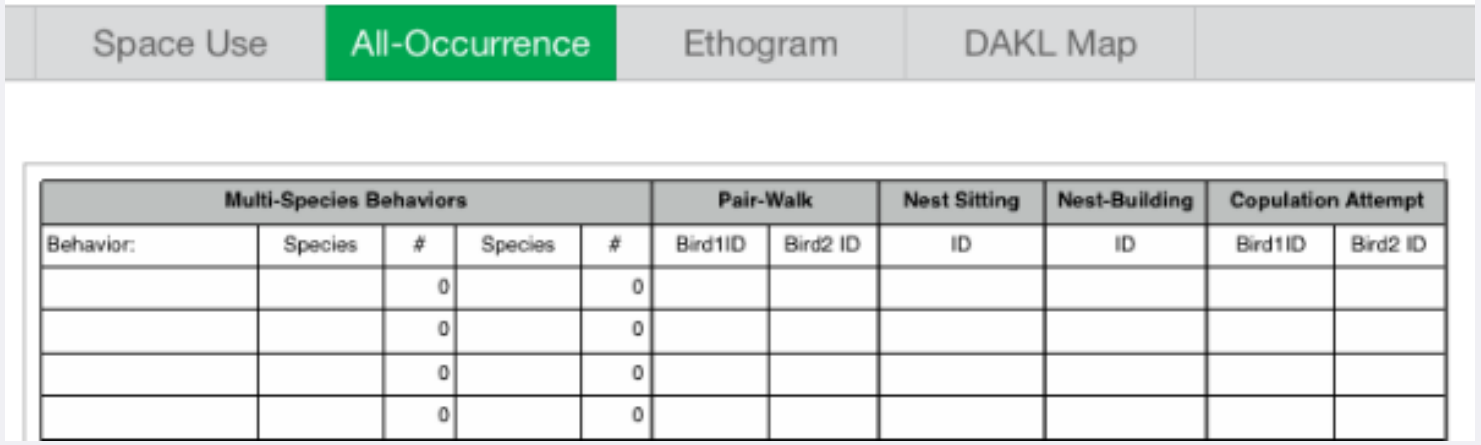


Data Collection Sheets



+ | Space Use | All-Occurrence | Ethog

Date:		Start Time:		Observer:	
	Dirt		Stone		
	Greater	Lesser	Greater	Lesser	
5:00					
10:00					
15:00					
20:00					
25:00					
30:00					
					Lesser Fl
Scan:	Scan 1 - 0:00		Scan 2 - 30:00		
	Greater	Lesser	Greater	Lesser	
Green 80 Lt.					Ye
10 (was 82)					Ye
White 53 Lt.					Ye
Yellow 272 Rt.					Ye



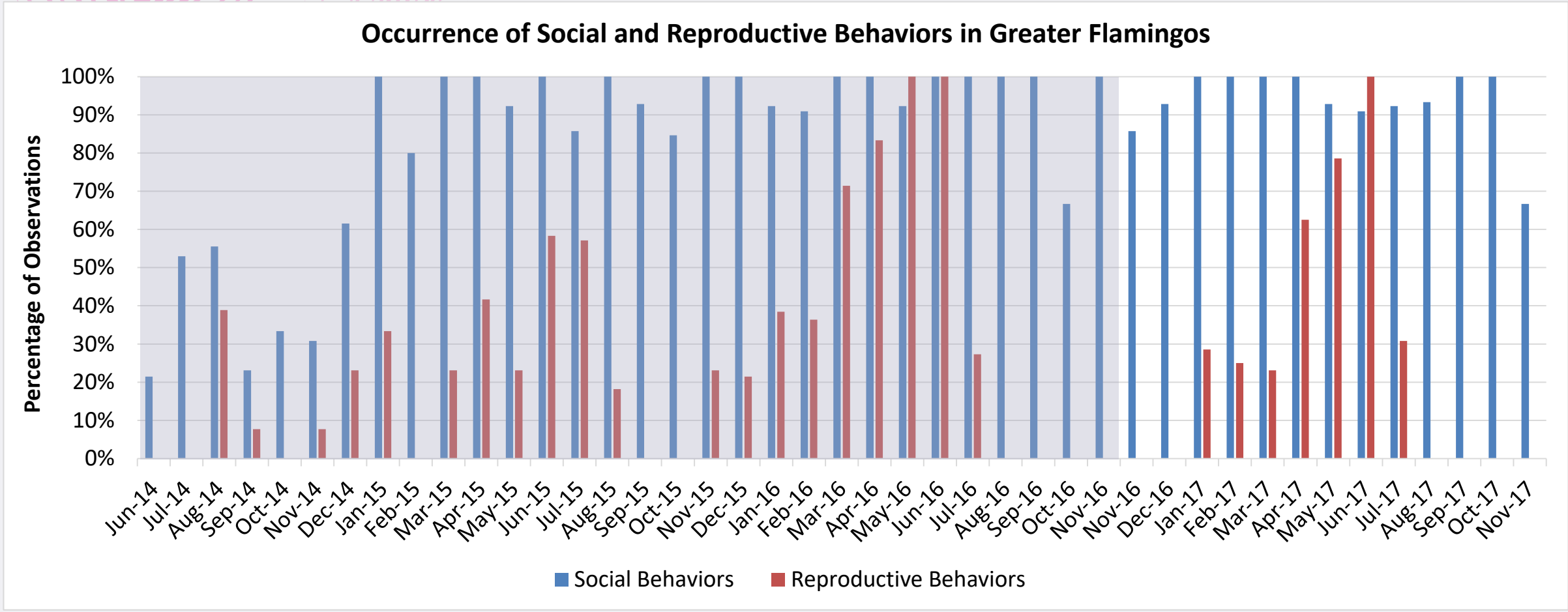
Space Use | All-Occurrence | Ethogram | DAKL Map

Multi-Species Behaviors					Pair-Walk		Nest Sitting	Nest-Building	Copulation Attempt	
Behavior:	Species	#	Species	#	Bird1ID	Bird2 ID	ID	ID	Bird1ID	Bird2 ID
		0		0						
		0		0						
		0		0						
		0		0						

- iPad Numbers App
- Very simple
- Transformation to Excel

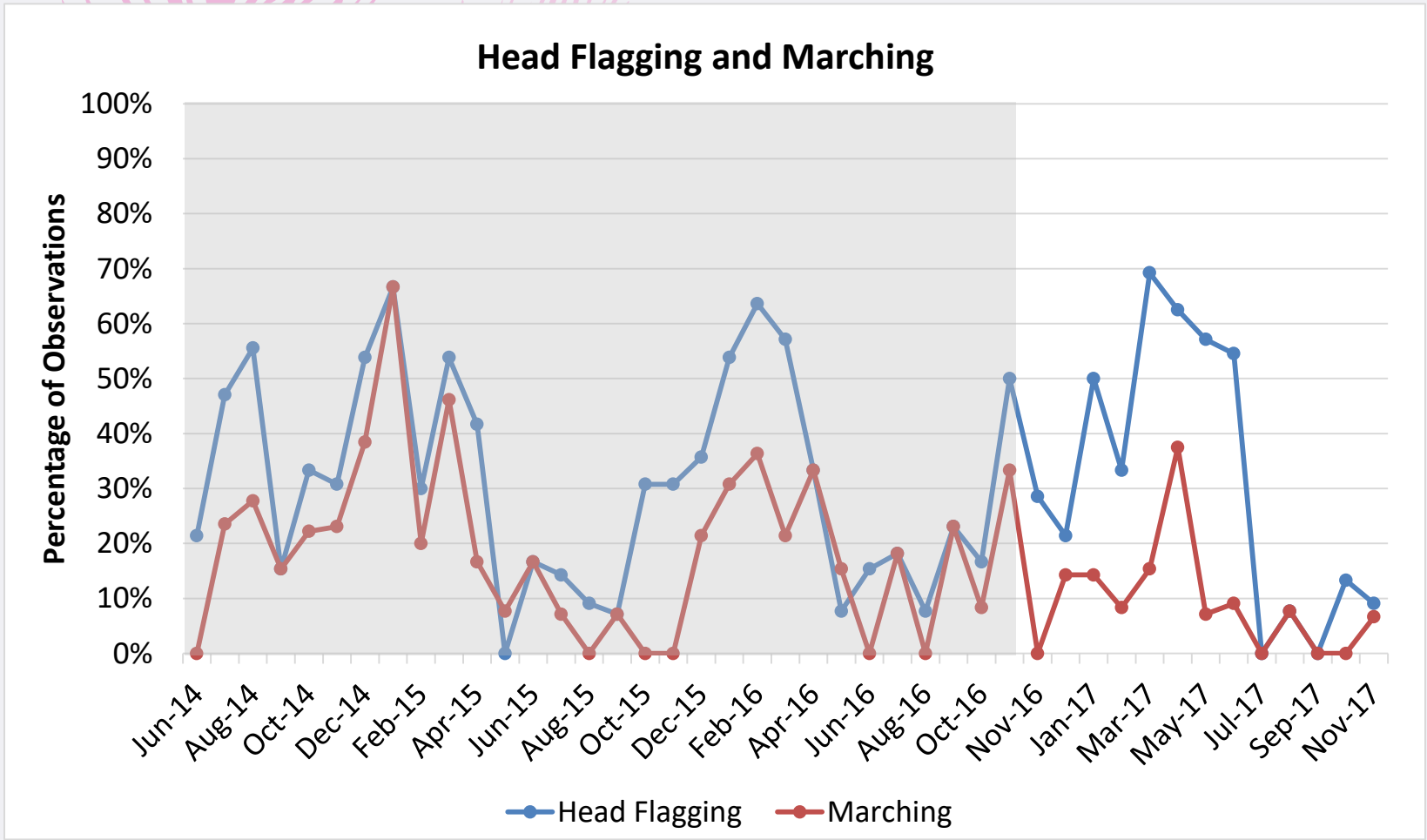
Grey shaded portion of all graphs is time when both species integrated at DAKL.
The Greaters displayed similar seasonal behavioral patterns with and without the Lessers in their exhibit at DAK Lodge. Generally, we saw peaks in the occurrences of social behaviors in the late winter/early spring, followed by reproductive/nesting behaviors in the spring/early summer.

Results: Greater Flamingos



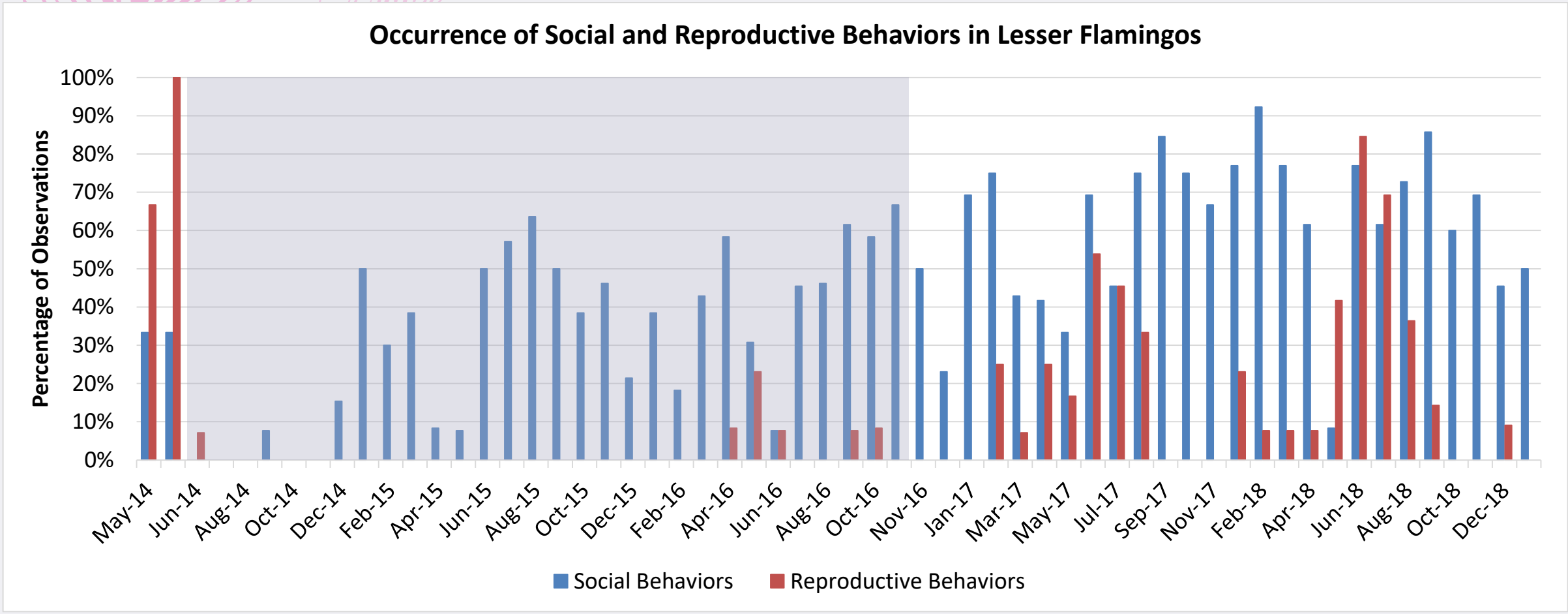
Head flagging and marching behaviors mirrored each other

Results: Greater Flamingos



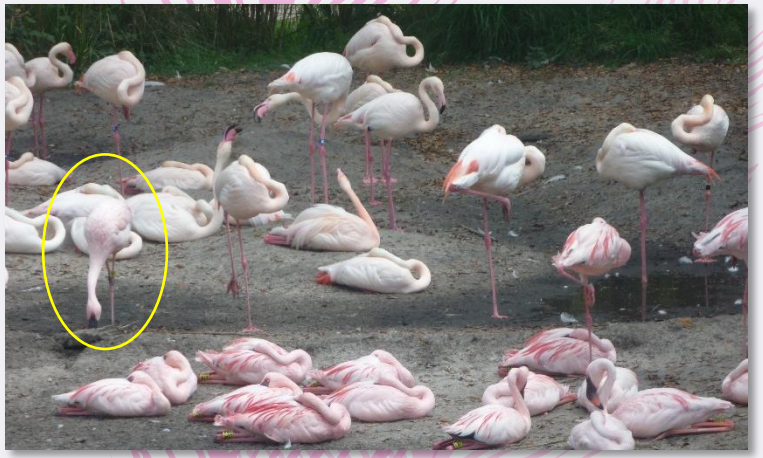
In the Lessers, social and reproductive/nesting behaviors were observed at higher rates after they returned to the TOL exhibit. While few behaviors were seen in the Lessers at DAK Lodge, rates of social and reproductive behaviors peaked at TOL and started to show seasonality. Within months of returning to the TOL exhibit, we saw peaks in social behaviors and higher rates of reproductive/nesting behavior than that observed over the 2 years they were at DAKL. At TOL, social behaviors peaked in late winter/early spring, followed by reproductive behaviors in the spring/summer. Lessers also showed increased in social behaviors in the late summer/fall.

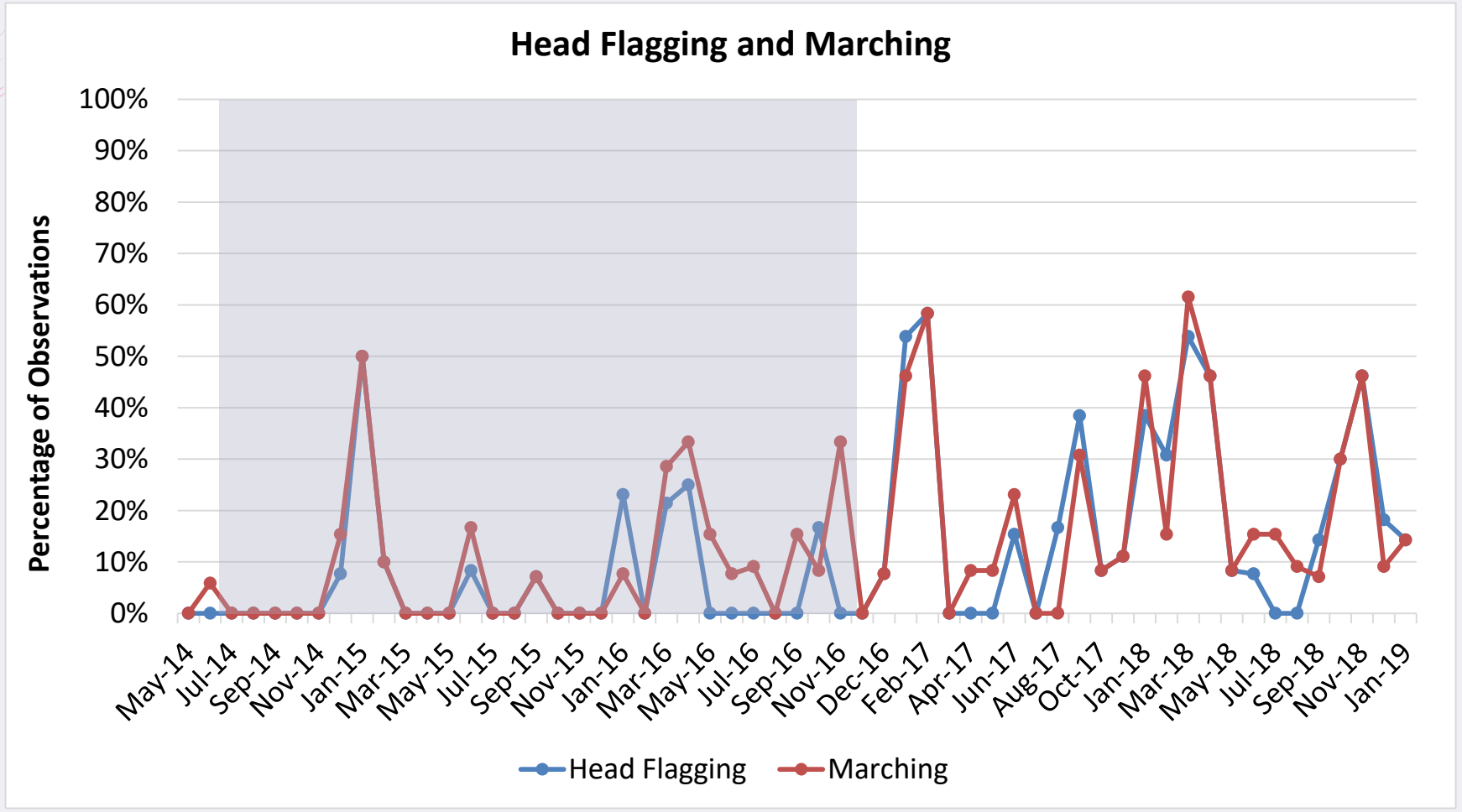
Results: Lesser Flamingos



Head flagging and marching behaviors mirrored each other
Many of the Lesser behaviors seen at DAKL were performed by chick (04) - who was raised by Greaters - participating in bouts with Greaters

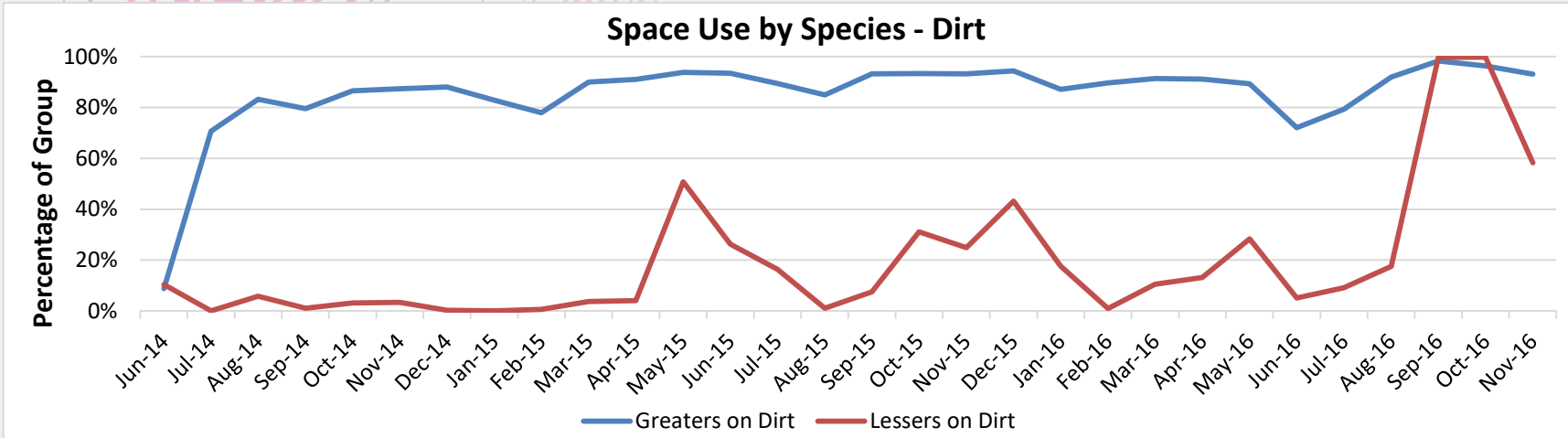
Results: Lesser Flamingos

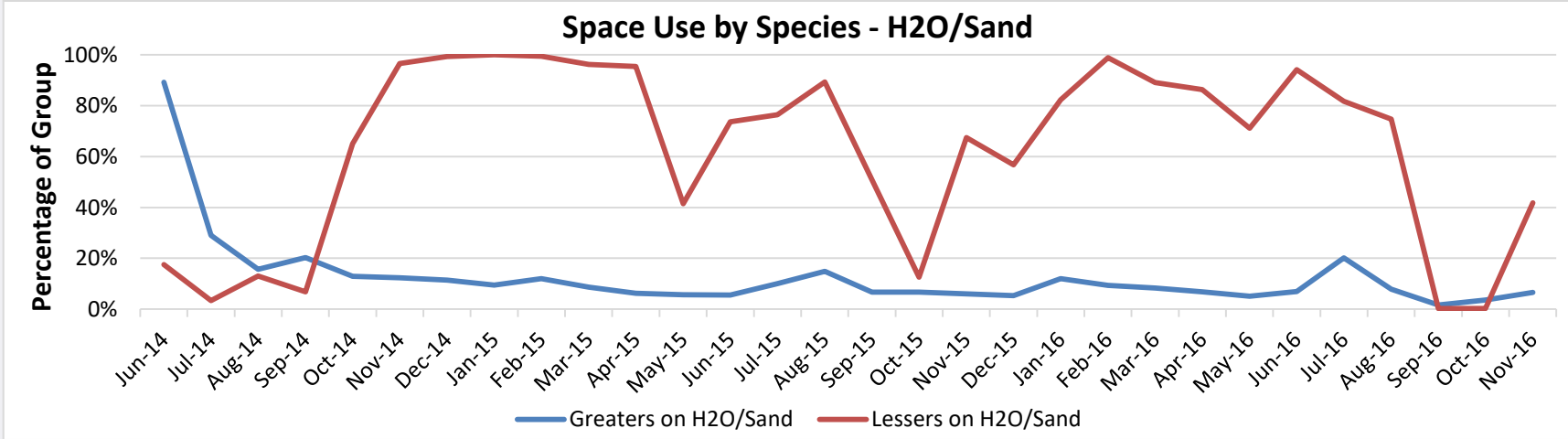




During their first several months at DAKL, Lessers did not use either preferred substrate. Instead, they were often observed on the H2O/stone. As of November, 2014, they started to spend more time in the H2O/sand while Greaters continued to monopolize the dirt area. Very little integration of species.

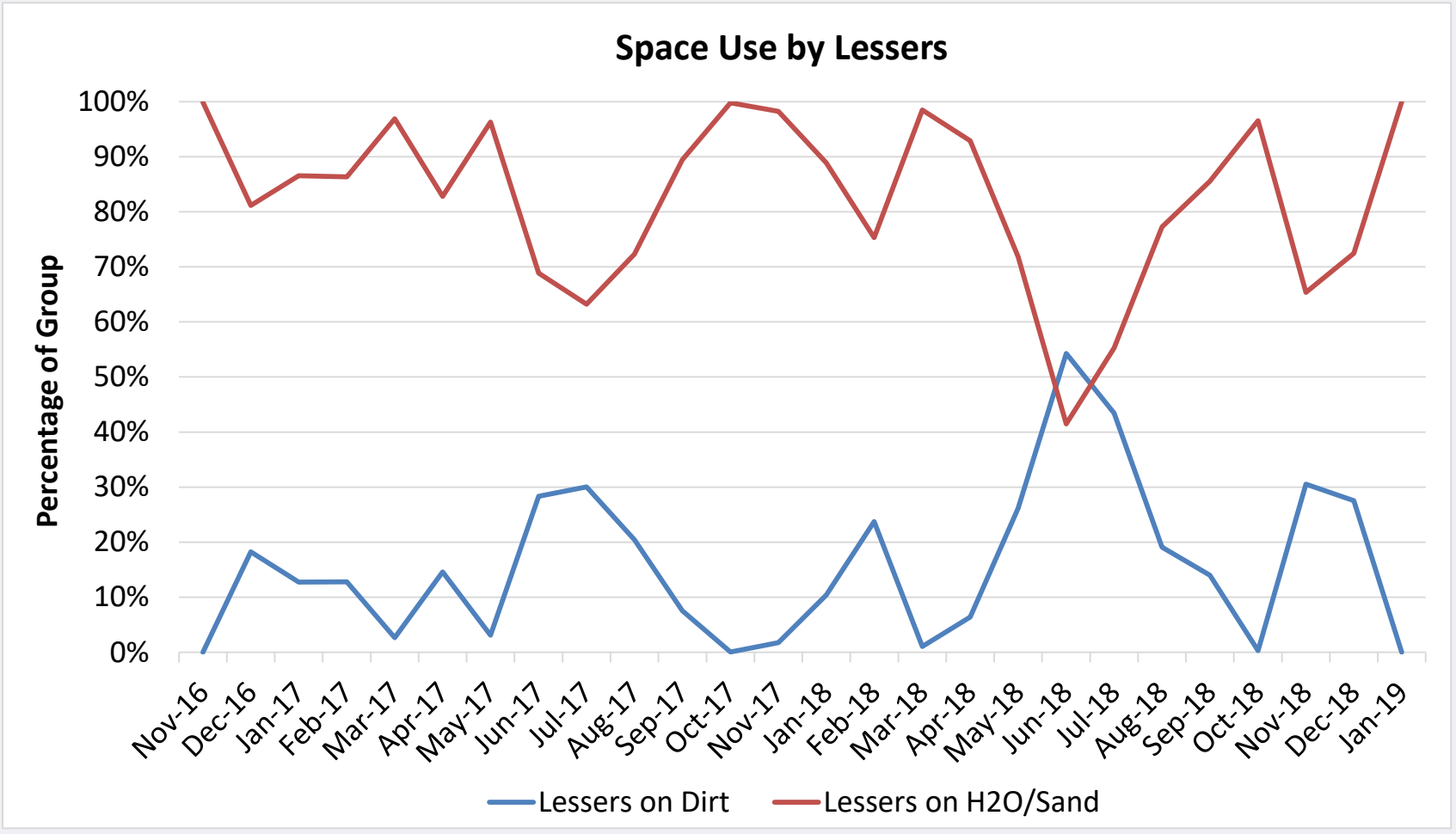
Results: Space Use at DAK Lodge





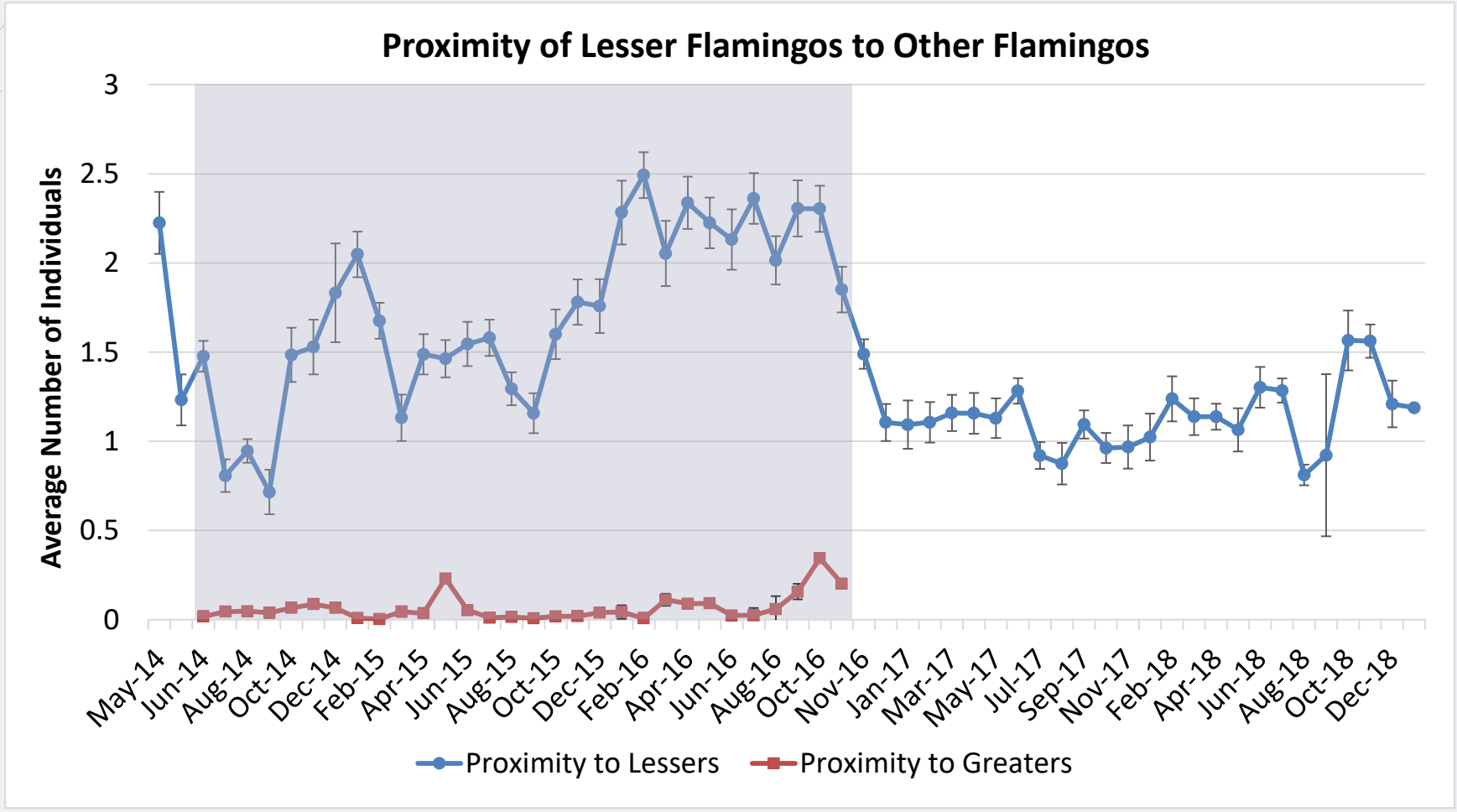
Lessers continued to spend a majority of their time in H2O/sand at TOL, going over to the dirt during the spring/summer months to nest build.

Results: Space Use at TOL



Lessers not often proximate to Greaters. Lessers proximate to 1-2 other Lessers at DAKL (average =1.73) – since moving back to TOL average is closer to 1 as they are spending time in pairs and utilizing more of the exhibit space

Results: Proximity



"Larger flock" of two species did not increase rates of reproductive behaviors.

Learnings and Conclusions

- Greaters displayed **clear seasonal behavioral patterns** with and without Lessers integrated.
- Lessers displayed **higher rates of species-appropriate behaviors** and **seasonality at TOL**.
  - Very few reproductive/nesting behaviors observed at DAK Lodge.
- Lessers **did not integrate** with Greaters at DAK Lodge.
- Lessers did not spend time proximate to Greaters, but were more likely to spend time near multiple birds of their same species at DAK Lodge.
  - At TOL, Lessers were most often found in pairs or spread throughout the exhibit space.

Welfare impacts – behavior of lessers was definitely impacted, however we kept in constant communication with team in order to make real time management decisions if needed. Also, behavior returned to species-appropriate levels soon after moving back to TOL.

Implications

- Impacts to Greaters were **minimal**.
- Rates of social/reproductive behaviors in Lessers **decreased after relocation**.
  - After 2 years, behavior patterns did not return to rates observed before relocation.
  - After returning to TOL, Lessers began displaying species-appropriate behavior within months.

Communication – for welfare monitoring and also to help keepers predict reproductive events and determine breeding pairs. Work with keepers to develop management strategies (timing for providing nesting materials and breeder pellets).

Communication Strategy

- Constant communication between teams
  - For welfare monitoring:
    - *Weekly bullets and bi-annual reports*
  - For day-to-day management:
    - *Predict reproductive events*
    - *Determine breeding pairs*
    - *Develop management strategies*
      - Provide nesting materials, breeder pellets, mirrors

Questions?

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