MIGRATION AND COLLISION AVOIDANCE OF EIDERS AT NORTHSTAR ISLAND, ALASKA

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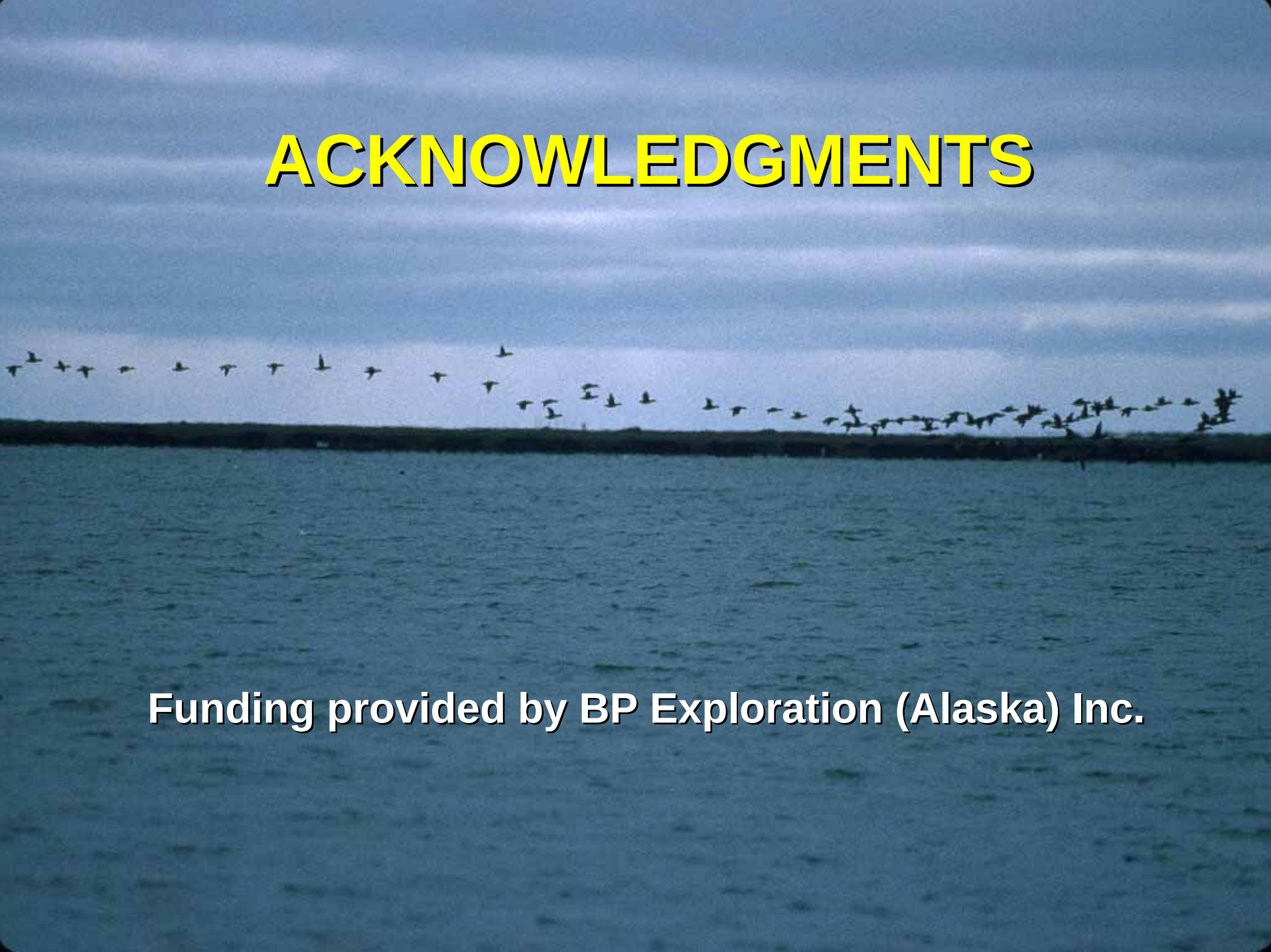

ACKNOWLEDGMENTS

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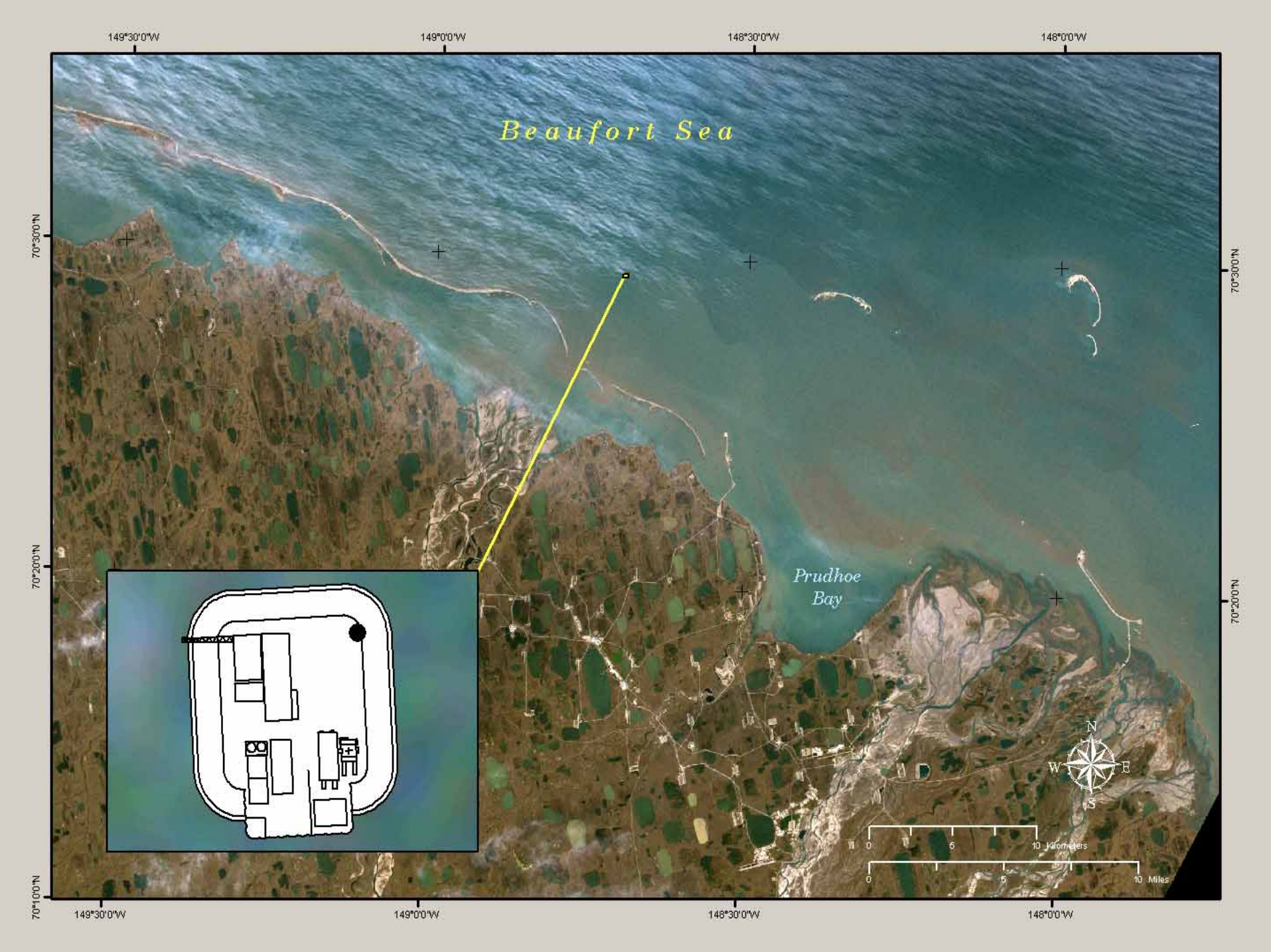
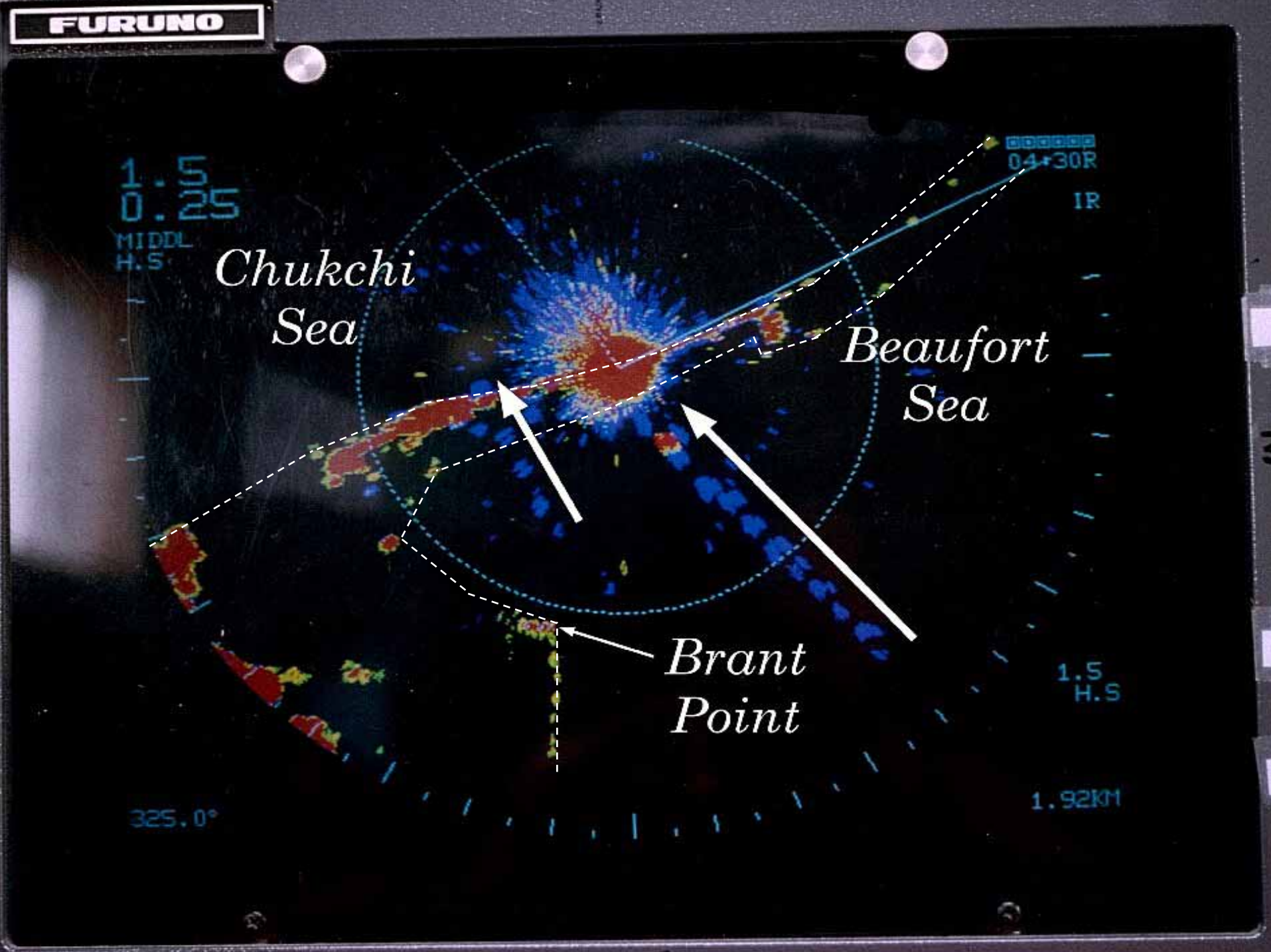

149°30'0"W
149°0'0"W
148°30'0"W
148°0'0"W
70°30'0"N
70°20'0"N
70°10'0"N
Beaufort Sea
Prudhoe Bay
N
S
E
W
0
5
10 Kilometers
0
5
10 Miles


HONEYWELL FAA-TYPE L865/L866
MEDIUM-INTENSITY OBSTACLE LIGHT
DAYTIME: 20,000-CA STROBE
NIGHTTIME: 2,000-CA FLASHING LIGHT
14 LIGHTS
40 FLASHES/MIN; ASYNCHRONOUS
WHITE LIGHT

OBJECTIVES

- Monitor migration and behavior of migrating eiders
- Determine whether eiders detect Northstar Island and respond to it
- Determine effects of anti-collision lighting system on migrating eiders


FURUNO
1.5
0.25
MIDDL
H.S
04+30R
IR
Chukchi
Sea
Beaufort
Sea
Brant
Point
1.5
H.S
325.0°
1.92KM

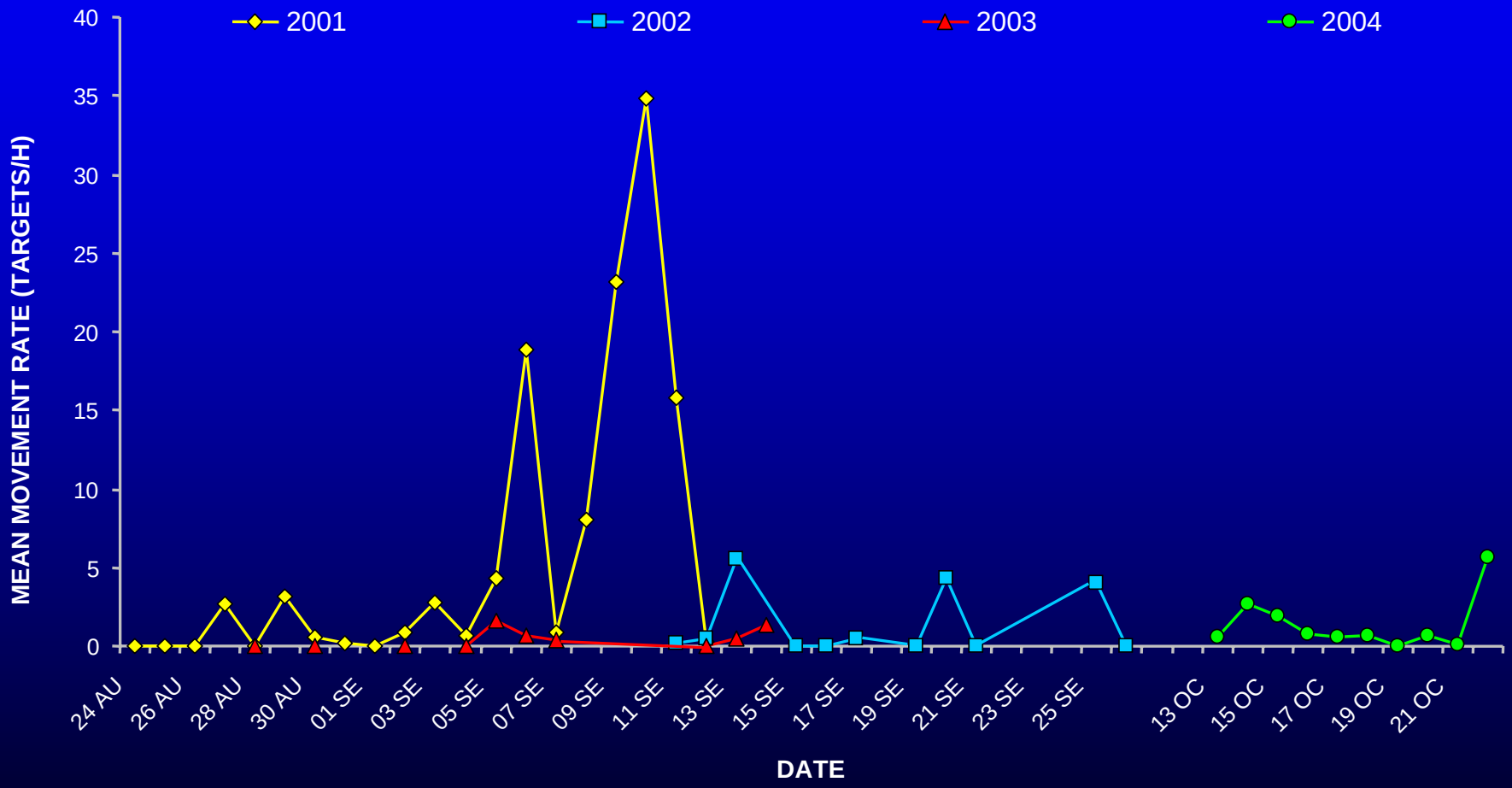
ENVIRONMENTAL/OTHER FACTORS

- Period (ice present, absent)
- Time of day
- Precipitation
- Visibility
- Wind (direction, strength)
- Moon phase/moon visibility
- Lights

RESPONSE VARIABLES

- Low-resolution responses
- High-resolution responses

PULSED, IRREGULAR MOVEMENT



MOVEMENT RATES

- Period (higher–ice present [2001])
- Precipitation (higher–no precipitation)
- Wind (higher–tailwinds, crosswinds)
- Lights ns

VELOCITY

- Mean ~77 km/h (~48 mi/h)
- Period (higher–ice present)
- Wind (higher–tailwinds)
- Wind strength (higher–strong tailwinds)
- Lights*time of day (higher day–lights on, lower night–lights on)

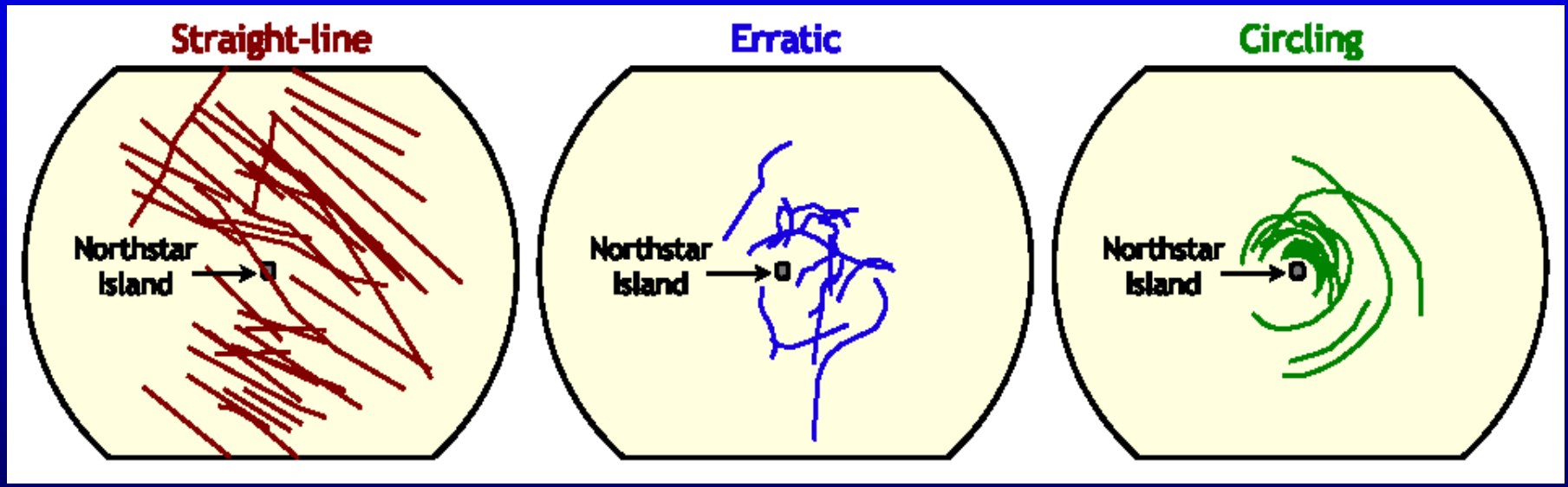
FLIGHT DIRECTION

- Mean 299° (to NW) when ice present
- Mean 281° (to WNW) when ice absent
- Mean 294° (to NW) overall

FLIGHT DIRECTION

- Lights ns
- Differences between periods caused by different proportions of wind directions between periods–more headwinds when ice absent

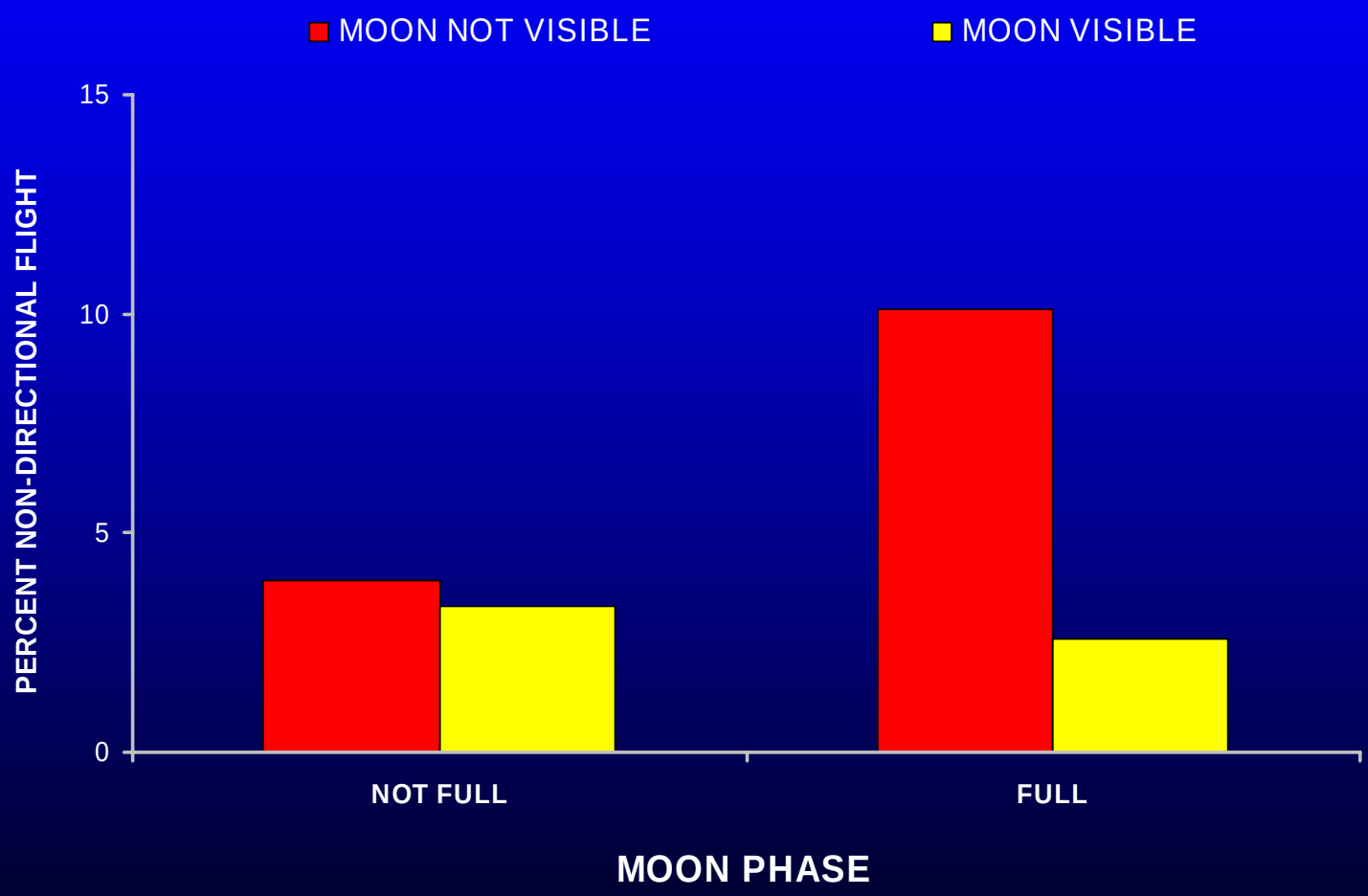
FLIGHT BEHAVIORS



FLIGHT BEHAVIOR

- ~5% non-directional behavior
- Period (higher–ice present)
- Wind (higher–tailwinds)
- Wind strength (higher–weak winds)
- Moon phase*moon visibility
- Lights ns

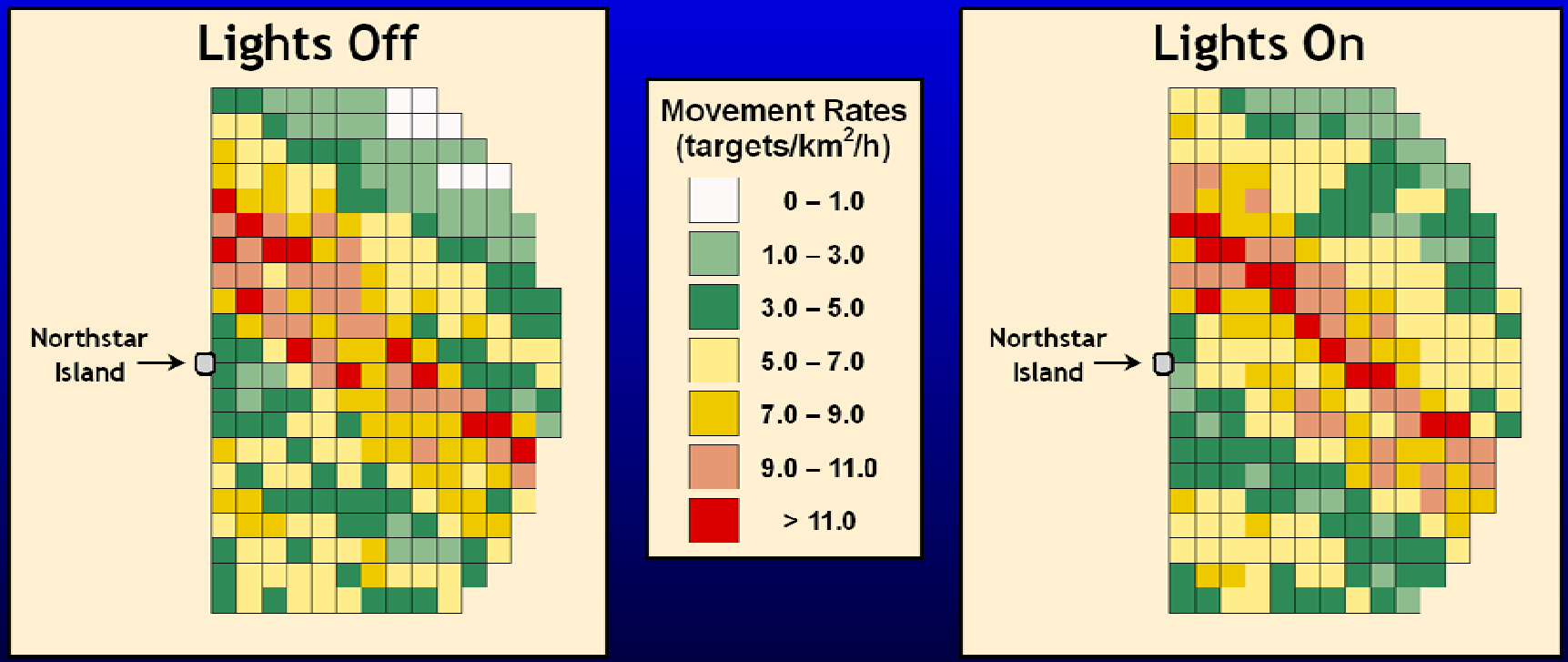
THE MOON AND BEHAVIOR



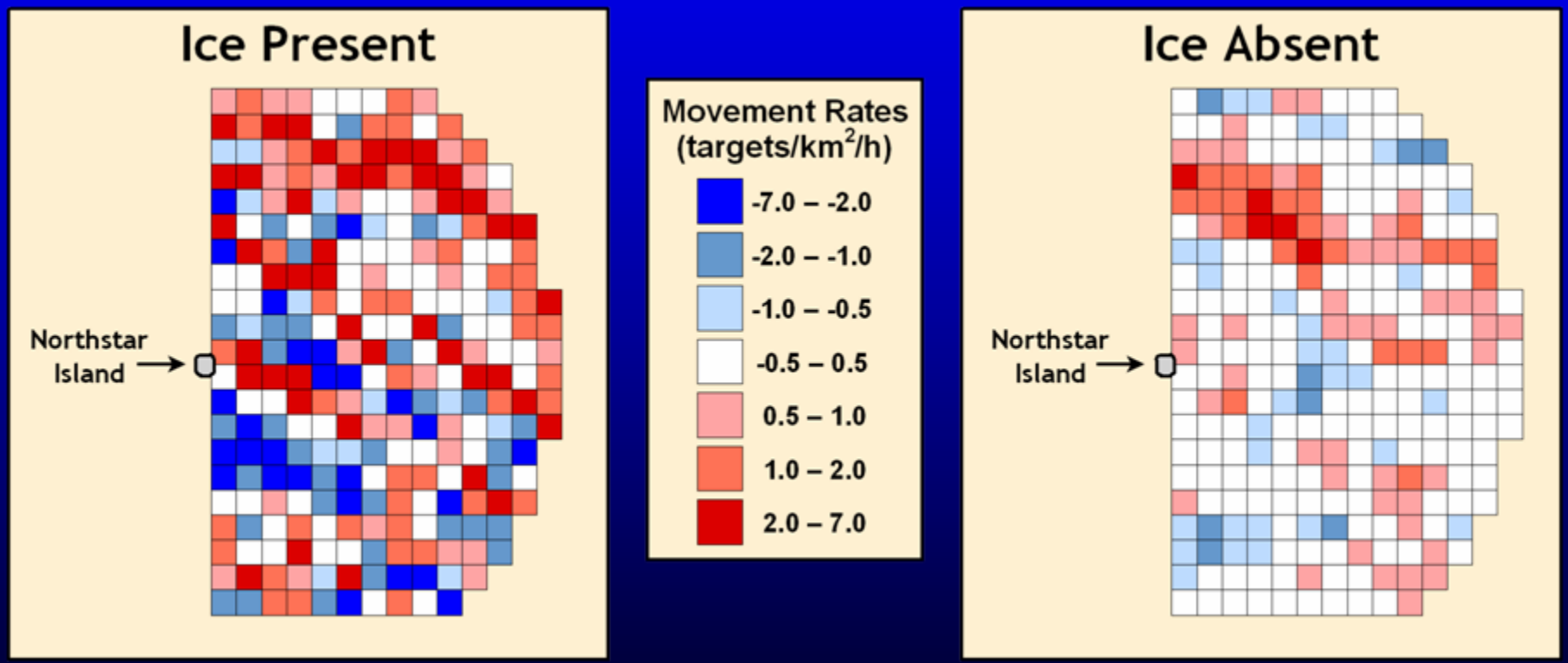
PASSING SUCCESS

- 99.1% successful
- No factors important
- Lights did not negatively affect ability to pass the island

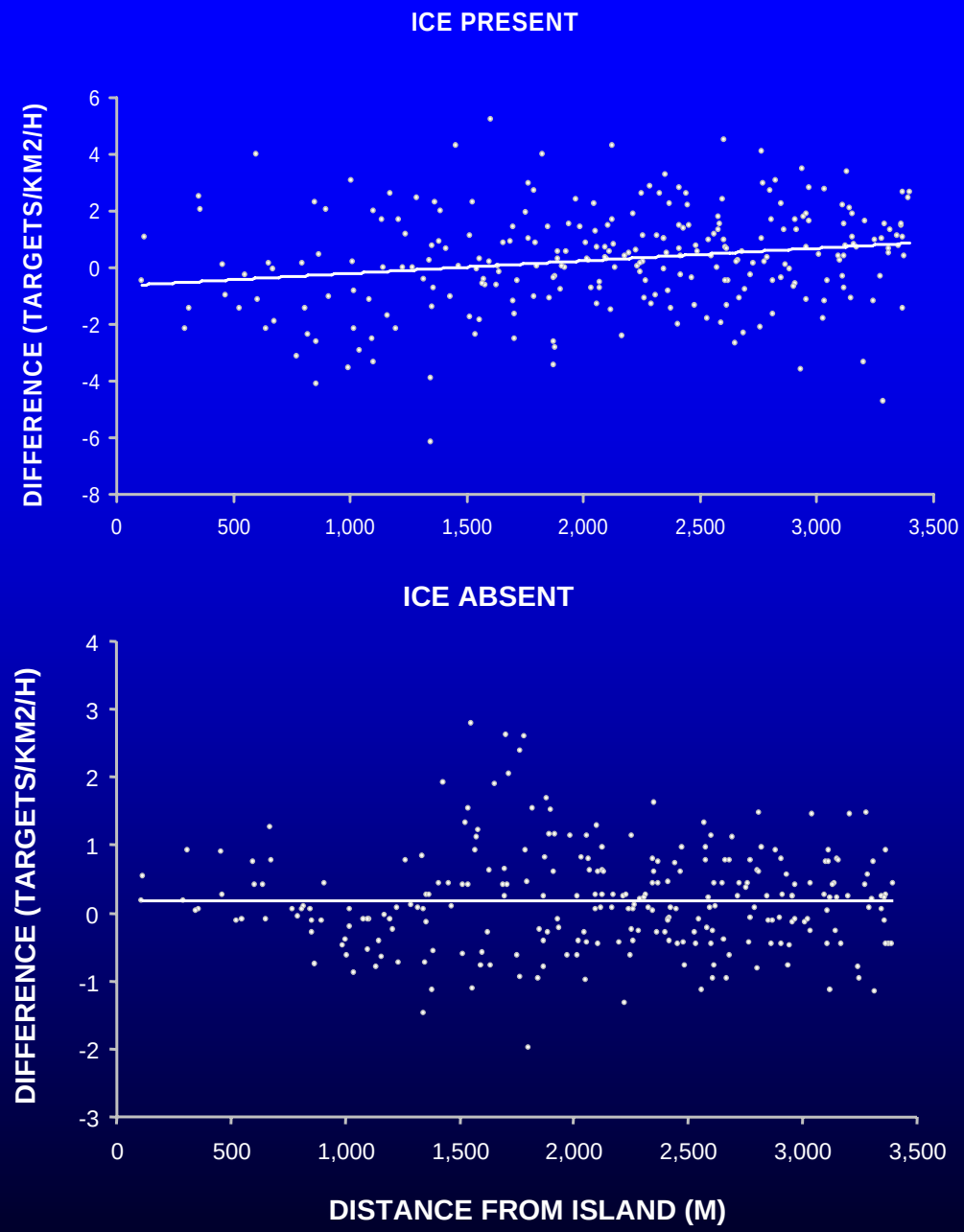
SPATIAL PATTERNS
ICE PRESENT



CHANGES IN PATTERNS



NET EFFECT OF LIGHTS



SUMMARY: EFFECTS OF LIGHTS
LOW RESOLUTION

ATTRIBUTE	RESPONSE
Movement rate	ns
Flight velocity	lights*time of day [#]
Flight direction	ns
Flight behavior	ns
Passing success	ns
Passing distance	ns
Distribution	avoidance (ice present)

([#] slower at night when lights are on)

SUMMARY: EFFECTS OF LIGHTS
HIGH RESOLUTION

ATTRIBUTE	RESPONSE
Vertices/km by distance	ns [#]
Vertices/km by orig. dist	ns [#]
Vertex distances	lights*vis., lights* wind
Angular changes	ns
Orig. vs. actual dist.	avoidance
Net passing distance	lights*wind (avoidance)

([#] natural avoidance)

SUMMARY (LOW-RESOLUTION)

- Eiders exhibit numerous responses to environmental conditions—especially wind, which strongly affects many aspects of migration

- Lights increase avoidance behavior of eiders at a large scale, although the effect is not dramatic and sometimes is seen primarily when ice is present

SUMMARY (HIGH-RESOLUTION)

- Eiders tend to have greater response as they approach the island
- This response generally is not significantly affected by lights—mostly a natural avoidance reaction
- But there is evidence for light-caused avoidance—at least, in some response variables


THIS CONCLUDES MY PRESENTATION. ARE THERE ANY QUESTIONS?
HOW DO I GET THE BOREDOM OUT OF MY HEAD?!!
THE FUNNY THING IS THAT I'LL LIST THIS ON MY ANNUAL ACCOMPLISHMENTS.
AIR! I NEED AIR!!!
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