

Panda Diversion Channel

**Ekati's Environmental Monitoring and Management
Programs Workshop - November 14th, 2007**



**Independent Environmental
Monitoring Agency**

Presentation Outline

- Introduction to the Panda Diversion Channel Monitoring Program
- Findings of the 2006 field season
- Agency comments on the findings

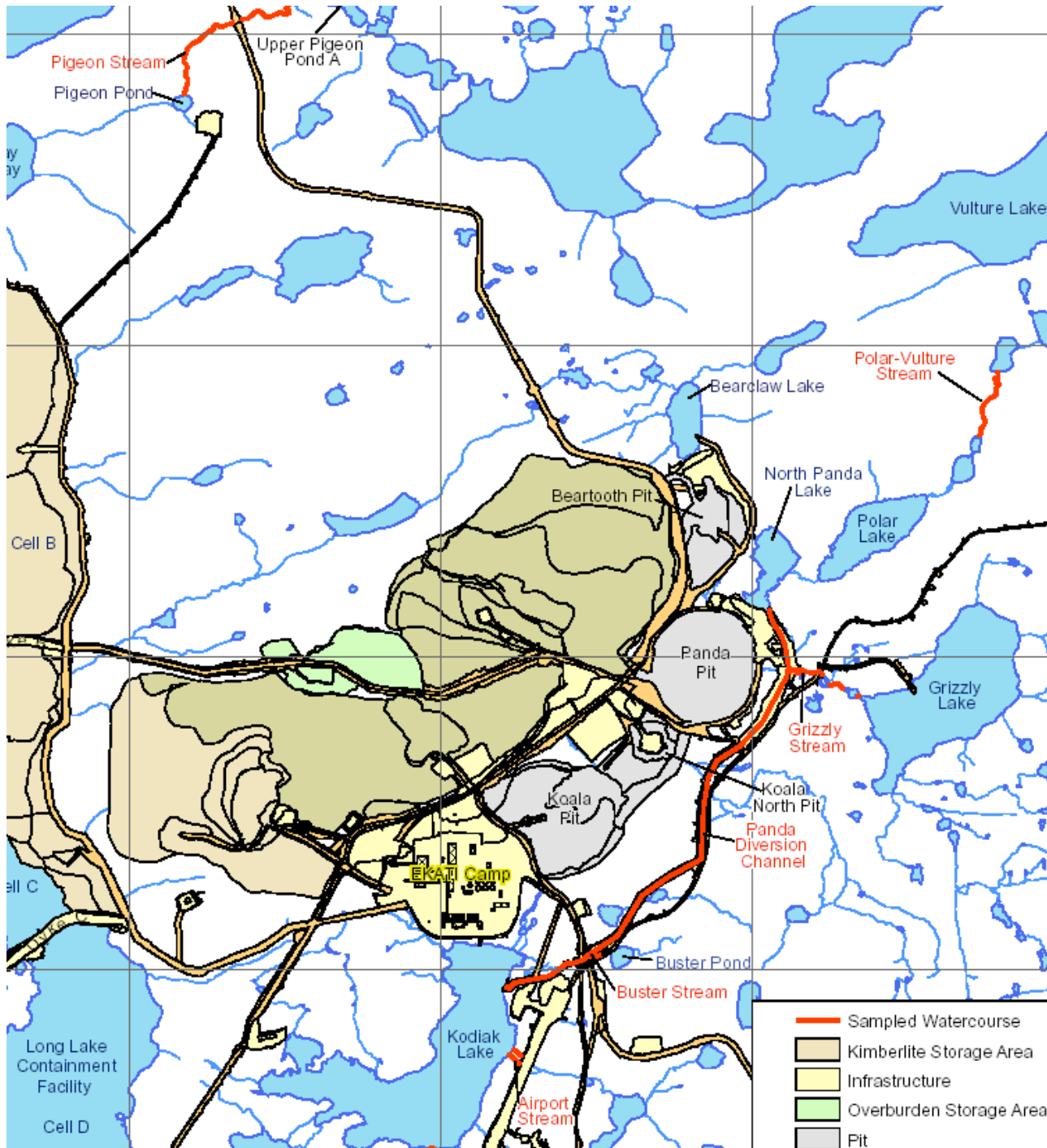
Introduction to The Panda Diversion Channel Monitoring Program



About the Panda Diversion Channel (PDC)

- Built from 1996-1998; 3.3 km long, between 2 and 10 metres wide
- Diverts water around the Panda and Koala pits into Kodiak Lake
- Reconnects the lakes above the main mine site to the lakes downstream of the LLCF
- Receives water from North Panda and Grizzly lakes
- Designed to replace lost stream fish habitat

Panda Diversion Channel & reference streams



= outline of the PDC

Source: PDC
monitoring
program report
2006

The Panda Diversion Channel Monitoring Program in 2006

- 2006: 8th year of study
- Overall objective – compare grayling growth rates and productivity of the PDC to grayling of natural streams close to the mine

Fish using the PDC

- - Grayling
- - Lake Trout
- - Round Whitefish
- - Burbot
- - Lake Chub
- - Slimy Sculpin

Fish Box at the Panda Diversion Channel during freshet, June 2006



Arctic Grayling

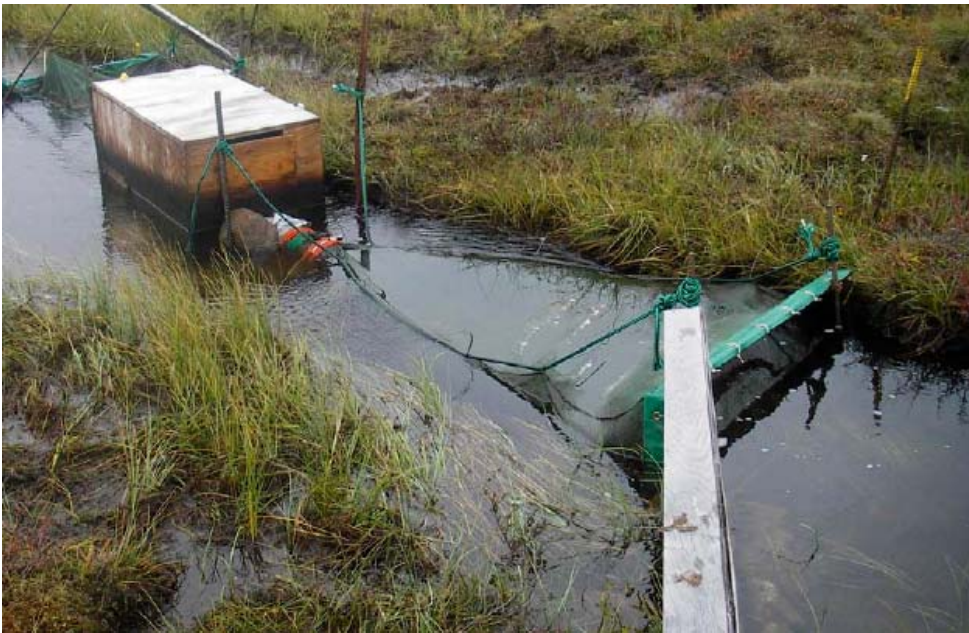
- Arctic grayling (or bluefish) are the most studied fish



- Most Arctic grayling enter the PDC from Kodiak Lake in early spring to spawn, others travel downstream from North Panda Lake

Sampling Sites in Reference Streams

Fyke net on Pigeon Stream



Fyke net on Polar-Vulture



- The fish habitat appears to be of similar quality to PDC
- Reference since 2003

2006 results

- Fewer grayling caught in the PDC in 2006 than any year since 2003 due to earlier-than-normal break-up → grayling moved in before monitoring gear in place

Year	2006	2005	2004	2003
Total Number Tagged	187	302	411	351
Number Spawners	110	266	411	351
% Repeat Spawners	10	20	16	11

Spawners

- Average age of spawners (8 year olds) higher than previous years.

Prominence of grayling younger than 9 years old suggest fry produced in PDC do survive in Kodiak L.

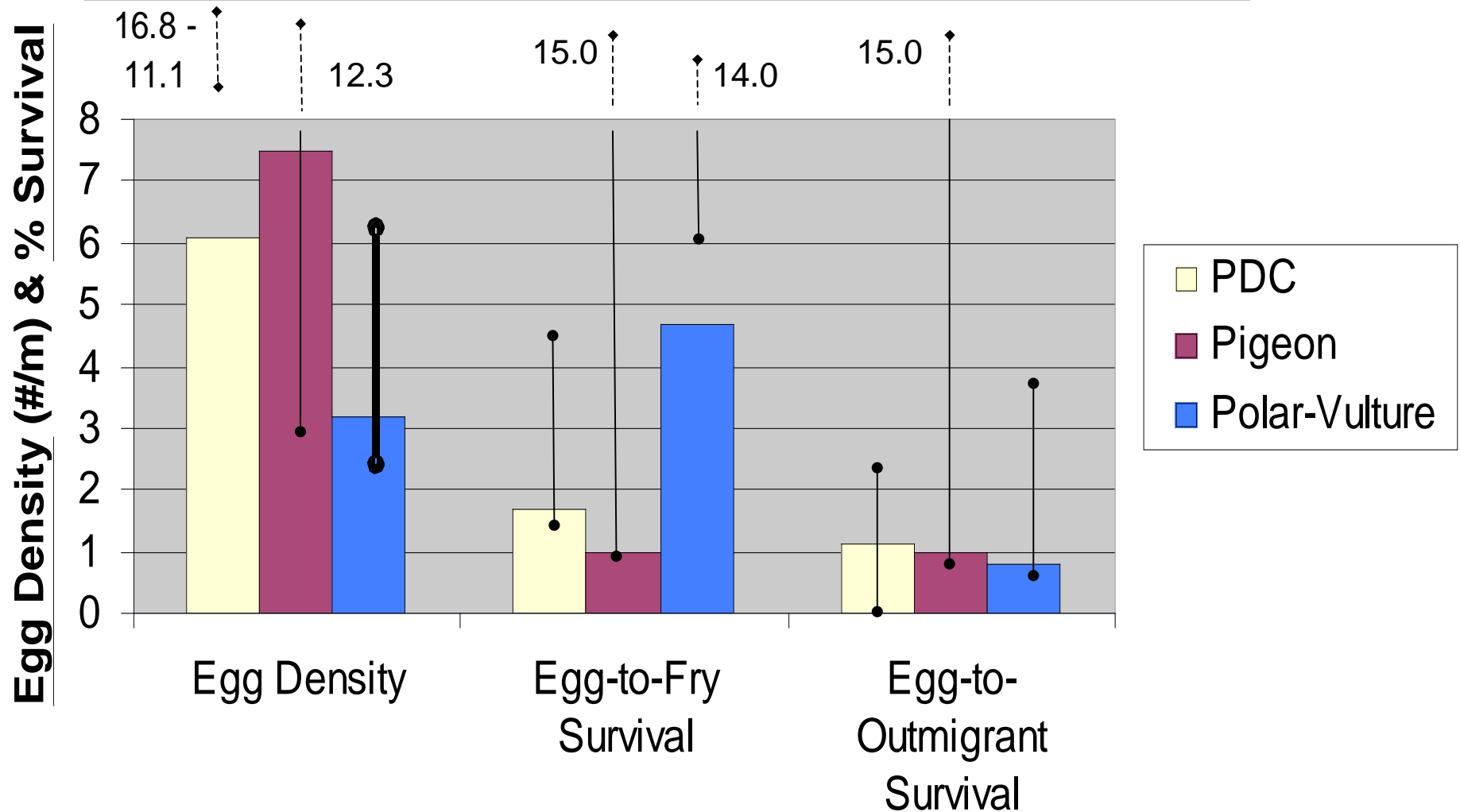
Grayling Fry Fitness

- Growth rate and lipid content of grayling fry is key for overwinter survival

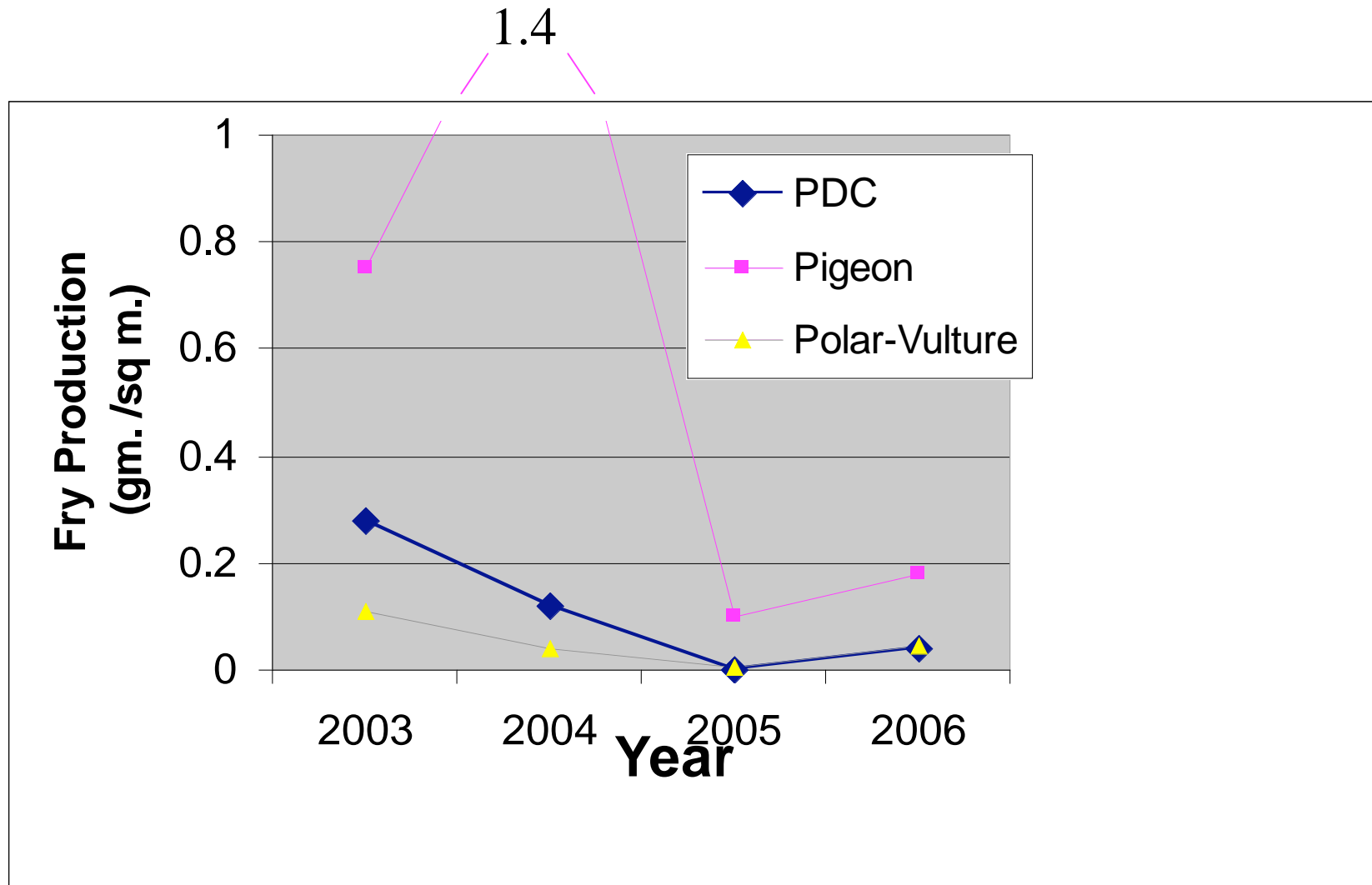


- Fry in PDC and in natural streams appear to grow at comparable rates
(between 0.6 and 0.7 mm/day)
- No differences among streams in lipid content
(from 1.4% to 5.4% of the total body weight)

Egg Density and Fry survival in PDC versus Reference streams



Annual Grayling Biomass Production (gm/m²)



Measuring grayling fry overwintering survival

- Adipose fin of some grayling fry clipped in 2003 (1668 total)
- These fry should return to the PDC to spawn when mature (4-5 years) starting in 2007

Agency Assessment

- Key question of grayling over-wintering survival not yet fully answered
- Some evidence exists that grayling young can survive the winter
 - spawners younger than the PDC using the channel
 - fry lipid levels similar to those of reference

Agency Assessment, cont.

RECOMMENDATION:

Conducting a mark-recapture analysis for marked (fin-clipped) 4-year-old grayling in 2007 should give a quantitative measure of PDC-produced graylings' ability to survive in Kodiak Lake.