Compliance with *Fisheries Act* Section 35(2) Authorisations:

A Field Audit of Habitat Compensation Projects in Canada

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Outline

1. Background

2. Overview
   - What is habitat compensation?
   - Why evaluate compliance?

3. Methods

4. Key results

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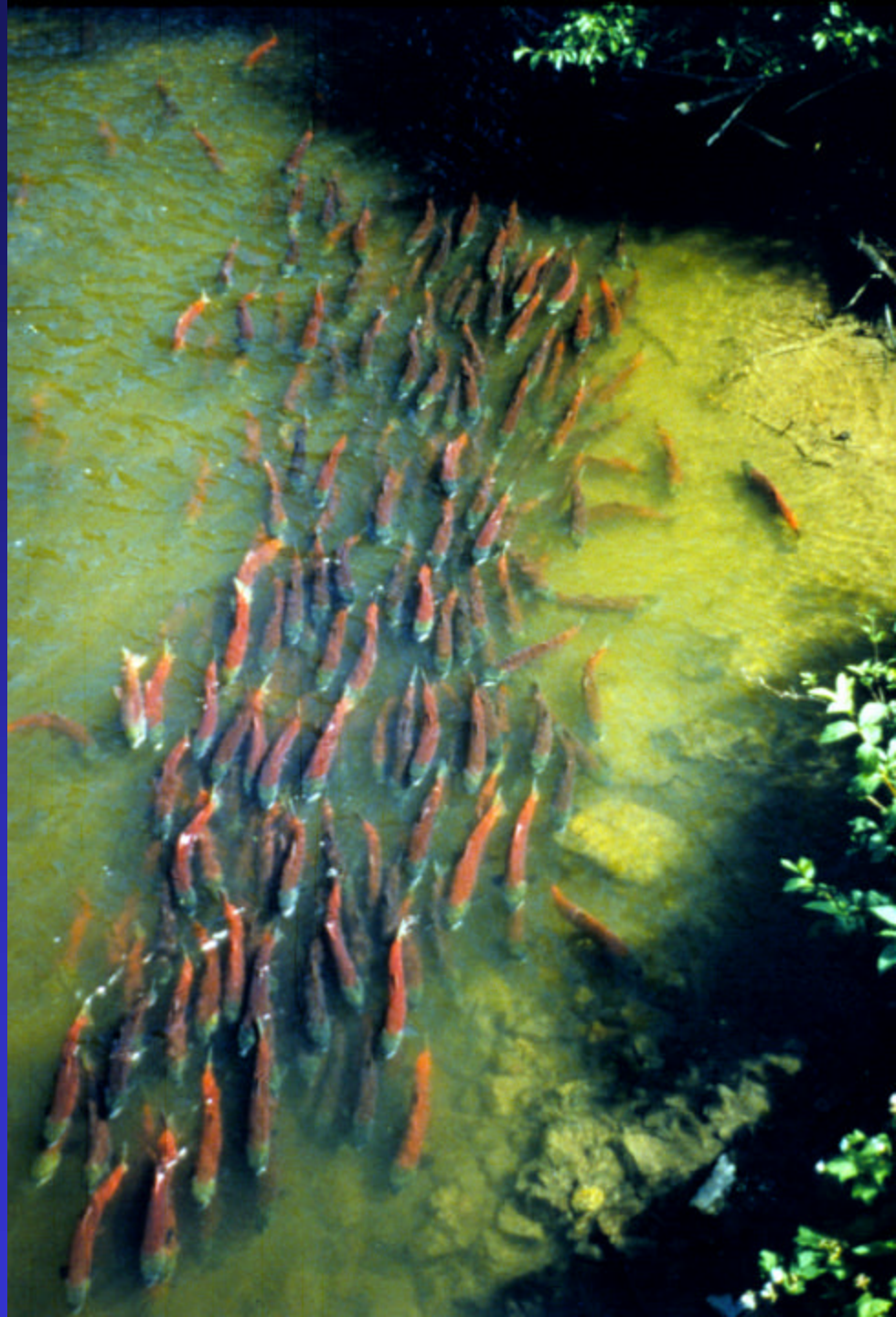
• Canada contains 1/4 of the world's wetlands, which support a rich biodiversity of over 200 fish species.

• In addition to intrinsic value, fisheries resources are important contributors to Canada's economy and social fabric.

• Loss of fish habitat, a leading factor in the decline of Canada's fisheries resources, has occurred at an unprecedented rate through the last century. We have lost 1/7 of the wetlands in Canada.



Loss of fish habitat has resulted from a variety of industry sectors

Background - Legislation and Policy History

To prevent further erosion of the resource base and ensure sustainable development, Canada enacted the habitat provisions of the *Fisheries Act* in 1976.

Section 35(1): "no person shall carry on any work or undertaking that results in a harmful alteration, disruption, or destruction of fish habitat" - (HADD).

Supplemented by the National Habitat Policy in 1986.

The guiding principle is: **No Net Loss of the Productive Capacity of Fish Habitats (NNL).**

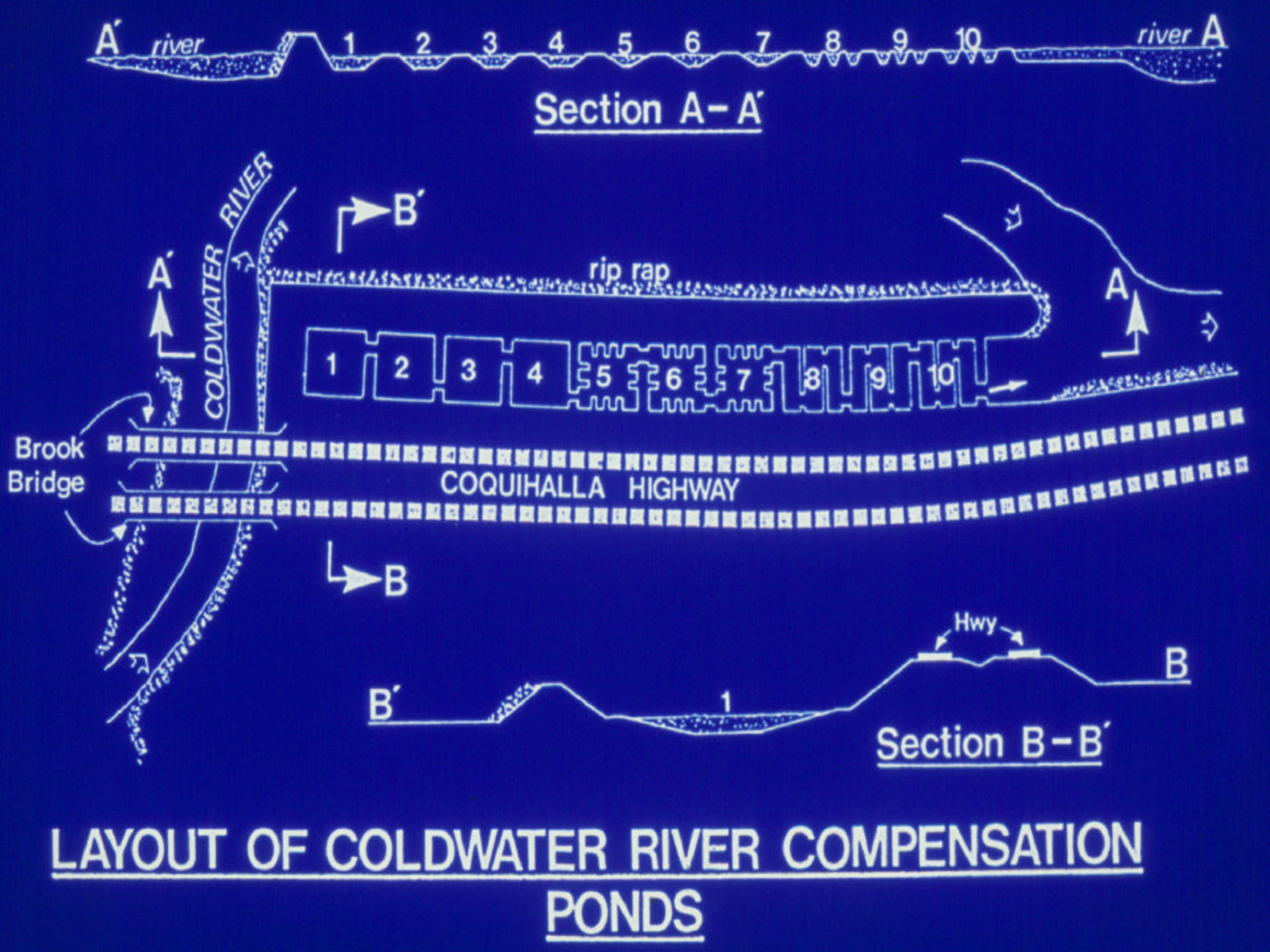
The Habitat Policy provides a hierarchy of preferences to achieve NNL….

1. Avoid/Re-locate
2. Re-design and mitigate
3. Authorise a HADD if:

- the residual impacts can be off-set with compensation habitat to ensure NNL; and
- the project is in the public's best interest.

Overview
What is Habitat Compensation?

- Generally involves creating new fish habitat or enhancing the productivity of existing habitat to ensure NNL.
- Regulated through a Section 35(2) authorisation, with legally binding requirements (size, characteristics).
- Monitoring requirements (performance criteria).



LAYOUT OF COLDWATER RIVER COMPENSATION PONDS

Overview – Why evaluate compliance?

Even though Canada has received accolades for its progressive fish habitat conservation policies, its performance in achieving these goals are unknown.

Objective:

Determine compliance across Canada with the legally binding requirements in *Fisheries Act* authorisations including habitat compensation.

Methods

- We randomly selected 52 authorisations across Canada.
- Represents 42% of the total number of authorisations issued during this time period.
- We selected authorisations issued between 1994 and 1997, and field work was completed in 2000 and 2001 ensuring a post-construction age range of 4-8 years.

Methods - Office

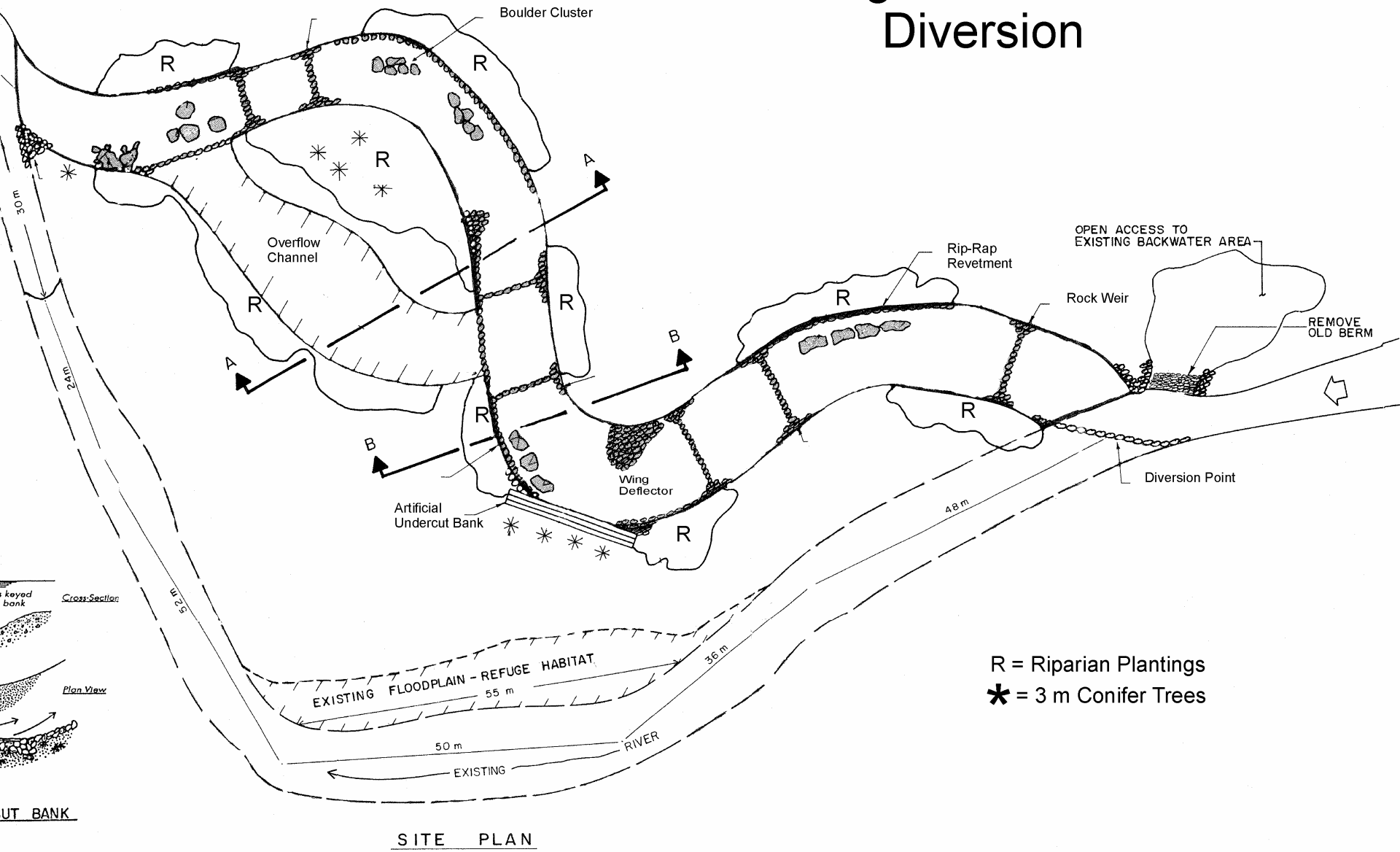
- Many authorisations specified the HADD and compensation areas both in writing and in scale drawings appended for further detail.
- Scale drawings were digitised to compare to written areas.
- In many cases, areas described in writing and in scale drawings were inconsistent.
- These discrepancies were enumerated and called authorisation contradictions.

Methods – Field

The legally binding requirements in each authorisation were partitioned into the following 7 categories:

1. HADD area requirements
2. Compensation area requirements
3. Construction specifications
4. Habitat features
5. Mitigation
6. Biological
7. Chemical

Big Trout River Diversion



SITE PLAN

Cross-Section

Plan View

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ROSEEDED WITH A
HARDY GRASSES
VERS

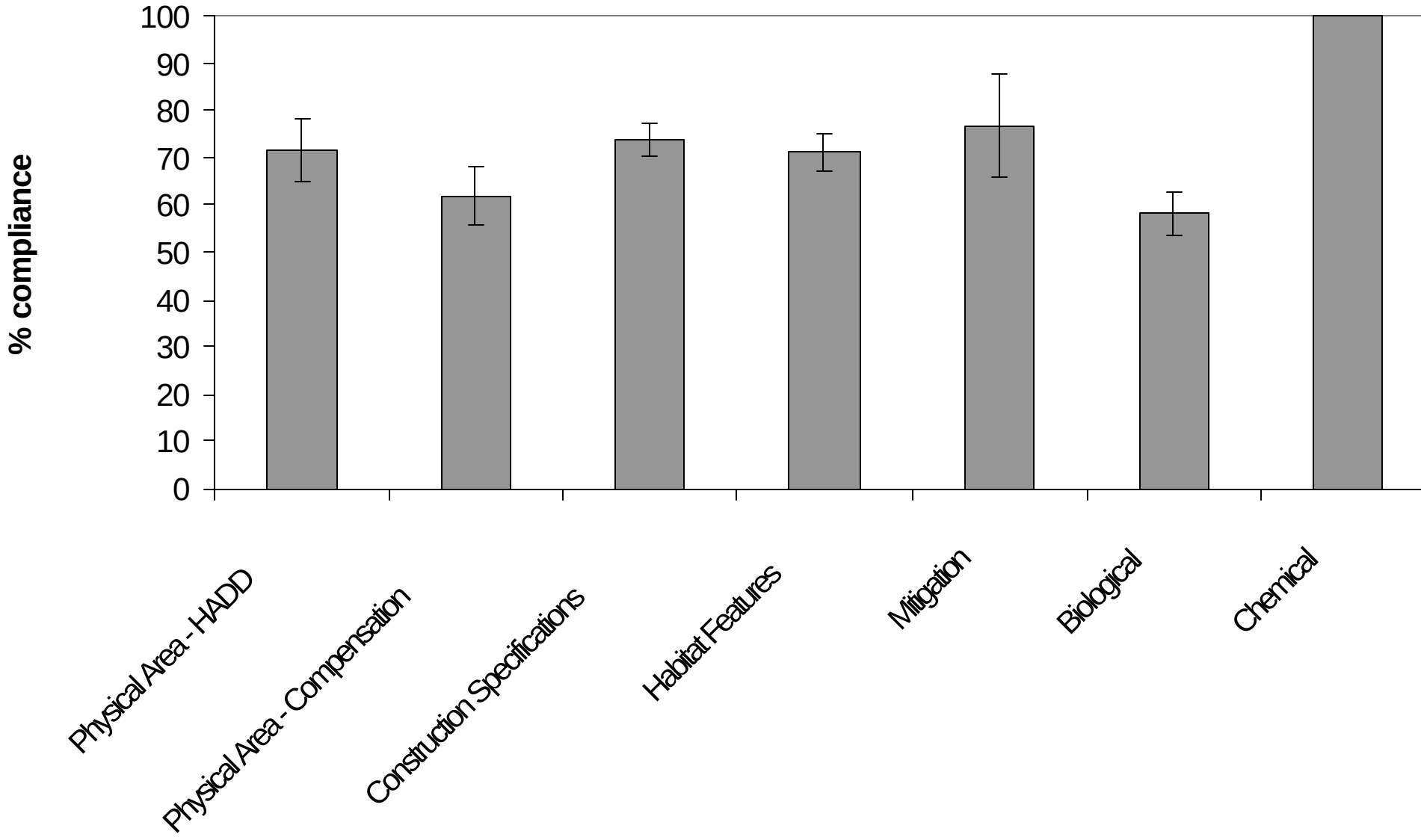
Methods - Field

- The number of additional ecological impacts (probable *Fisheries Act* violations) that occurred as a by-product of each authorisation were recorded.

Key Results

- Compliance with legally binding requirements was low (58% - 74%).
- Of note, only 19 % of authorisations were compliant with riparian vegetation requirements.
- In total, 1.04 million m^2 of compensation habitat audited (Mean age of projects: 4.4 yrs, mean number of requirements per project: 53).

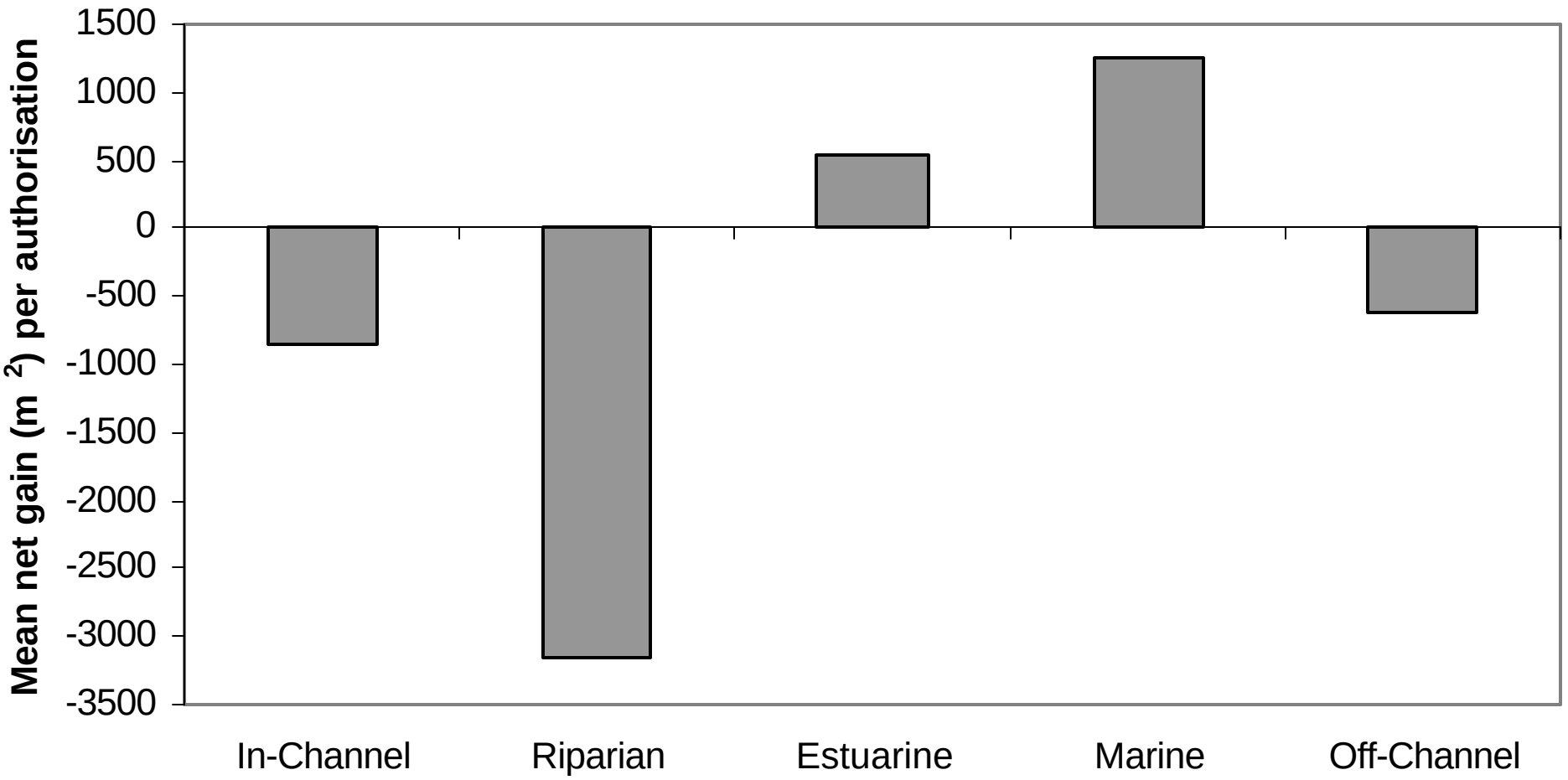
Key Results


% compliance
100
90
80
70
60
50
40
30
20
10
0
Physical Area - HADD
Physical Area - Compensation
Construction Specifications
Habitat Features
Mitigation
Biological
Chemical

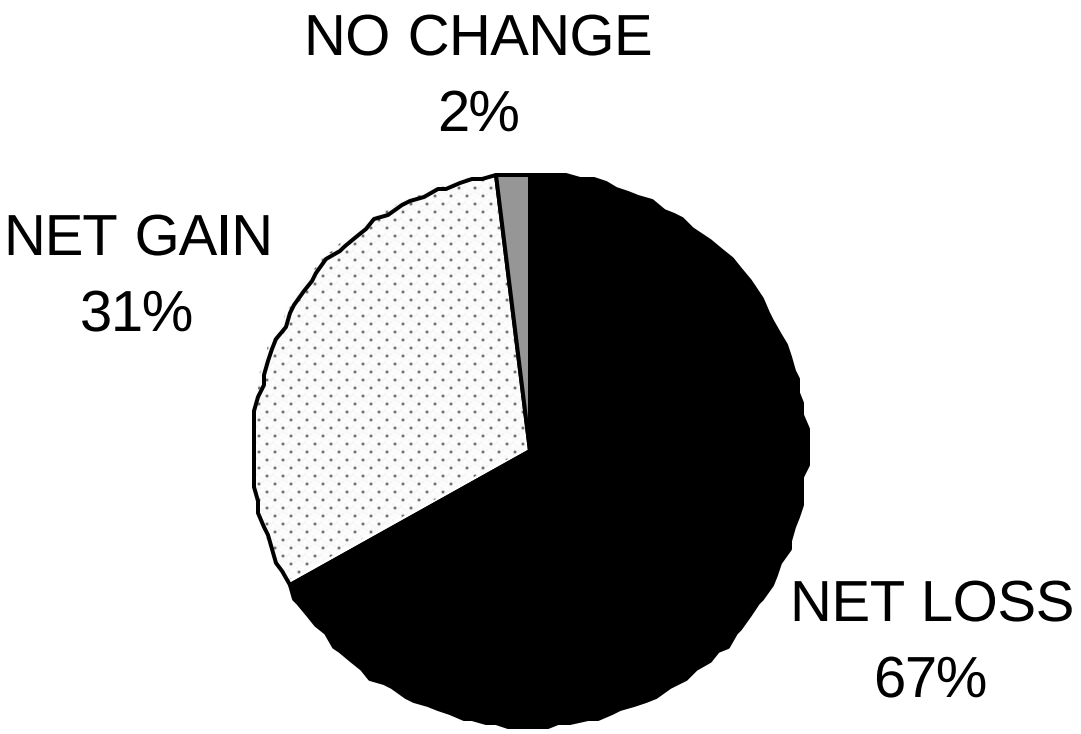
Key Results

- 86% of authorisations had larger HADDs and/or smaller compensation than authorised.
- These were not small differences, on average, HADDs were 389% larger than authorised.
- Mean net balance of habitat area (compensatory area minus HADD area) per authorisation was -2103 m^2
- What if DFO had not been involved at all? Mean net balance per authorisation would have been -8627 m^2

Key Results

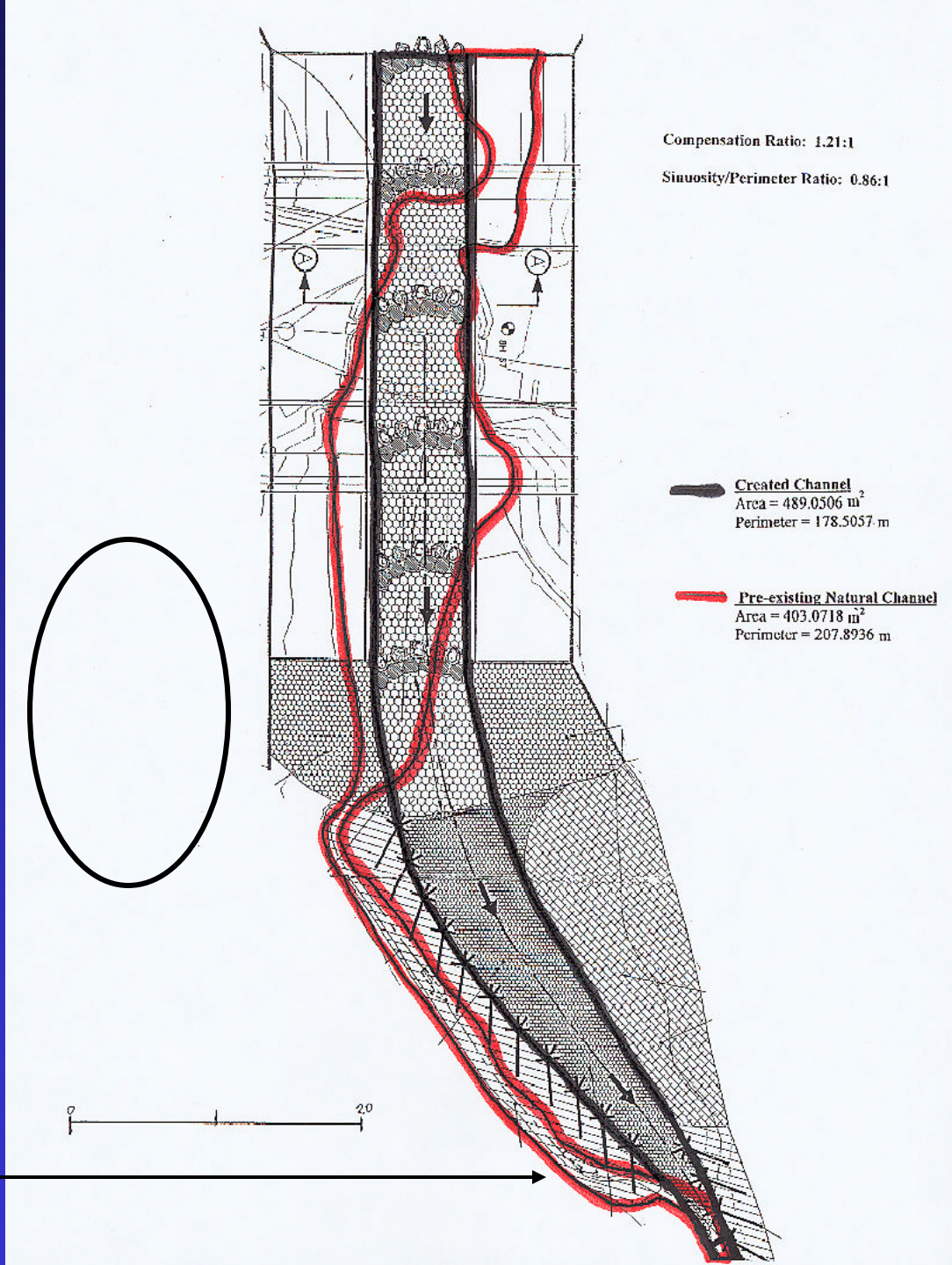

Mean net gain (m 2) per authorisation
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
In-Channel
Riparian
Estuarine
Marine
Off-Channel

Key Results



Example of a compensation project that resulted in a loss of habitat area.

Compensation Area to HADD Area Ratio: 1.21:1



Key Results

- We documented 26 additional ecological impacts (*Fisheries Act* violations), exclusive of non-compliance findings (52 projects).

- These additional impacts were prevalent and likely reduced the effectiveness of the compensation habitats in achieving NNL.

Key Results – Office Analysis

- 37% of authorisations contained contradictions between text and scale drawings.
- Mean difference in area between the authorisation text and scale drawings was 165%.
- Generally arose due to a lack of confirmation, by DFO, that areas contained in scale drawings provided by the developer conformed to the negotiated areas in the authorisation text.
- Provided the developer with a much broader range of habitat area legally allowed to be destroyed and compensated.

Key Results

Multiple regression analyses revealed that:

- The frequency of additional ecological impacts was negatively associated with the occurrence of a DFO field inspection, and positively associated with the number of authorisation contradictions ($P = 0.0005$, $R^2 = 0.41$, $n=37$).

- The association between the presence of DFO field inspections and decreased frequency of additional ecological impacts provides empirical support for elevated monitoring.

Conclusions

1. NNL is not being achieved

- On paper, Canada should be achieving a net gain of habitat (in terms of area).
- However, upon inspection, the actual areas of compensation habitats are much less than required and actual HADD areas are much larger.
- Non-compliance with HADD and compensation areas contributed to substantial losses of habitat.
- Across Canada, we consistently found that riparian habitat compensation was not sufficient to off-set habitat losses.

Conclusions

2. Poor compliance is not unique to Canada

- In a comprehensive examination of permitted compensatory requirements pursuant to Section 404 of the Clean Water Act in the United States, actual compensation ratios were never met (Zedler and others 2001).

- The average compliance rate with required ratios was 69% in these studies, which is similar to compliance rates we documented in Canada.

Recommendations

1. Need for monitoring and enforcement

- On a national basis, DFO habitat management staff allocate 1.7% and 1.3% of their workload on compliance monitoring and enforcement respectively (KPMG 1999).

- Rarity of monitoring and enforcement activities are likely contributing factors to poor compliance.

Recommendations

2. Need for hydrological and engineering review of compensation proposals.

- Habitat loss as a result of improperly installed or designed compensatory structures (e.g. perched culverts, impassable weirs, dry channels) was considerable.

- In many cases, these losses were thousands of square metres, exceeding the original HADD that necessitated the compensation habitat by orders of magnitude.

- Poorly designed compensatory works also caused habitat fragmentation by obstructing or impeding juvenile migration resulting in isolation of individuals from the rest of the population.

Recommendations

3. Need for clear requirements

- Requirements in the authorisations were often vague and un-measurable
- Poorly defined requirements gave rise to situations where proponents were entirely compliant, yet functional success of the compensation habitat was doubtful.

Recommendations

4. Need for institutional change

- Habitat compensation, as currently implemented in Canada, is not achieving NNL but is slowing the rate of habitat loss (SNL).
- But….there is a strong and growing reliance upon habitat compensation as a mechanism to conserve fish habitat in Canada.

Recommendations

4. Need for institutional change

- So what do we do differently?
- Increasing the amount of authorised compensatory habitat in the absence of institutional changes in implementation will be un-likely to reverse this trend of SNL.
- Improvements in monitoring and enforcement could be effective mechanisms to achieve NNL.