

# Pacific Rim Coho GSI: Potentials for Coho

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# Already Great Promise!

All primary west-coast fisheries genetics labs already have coho molecular genetics programs in operation

– some with 10 years or more experience

# Feasibility

Certainly!

# Cost

Depends on how many labs, loci and populations are involved

GAPS seems an effective forerunner

About \$1,5000,000

# Timeframe for coast-wide standardization

About 3 – 4 years

# Desired levels of Resolution

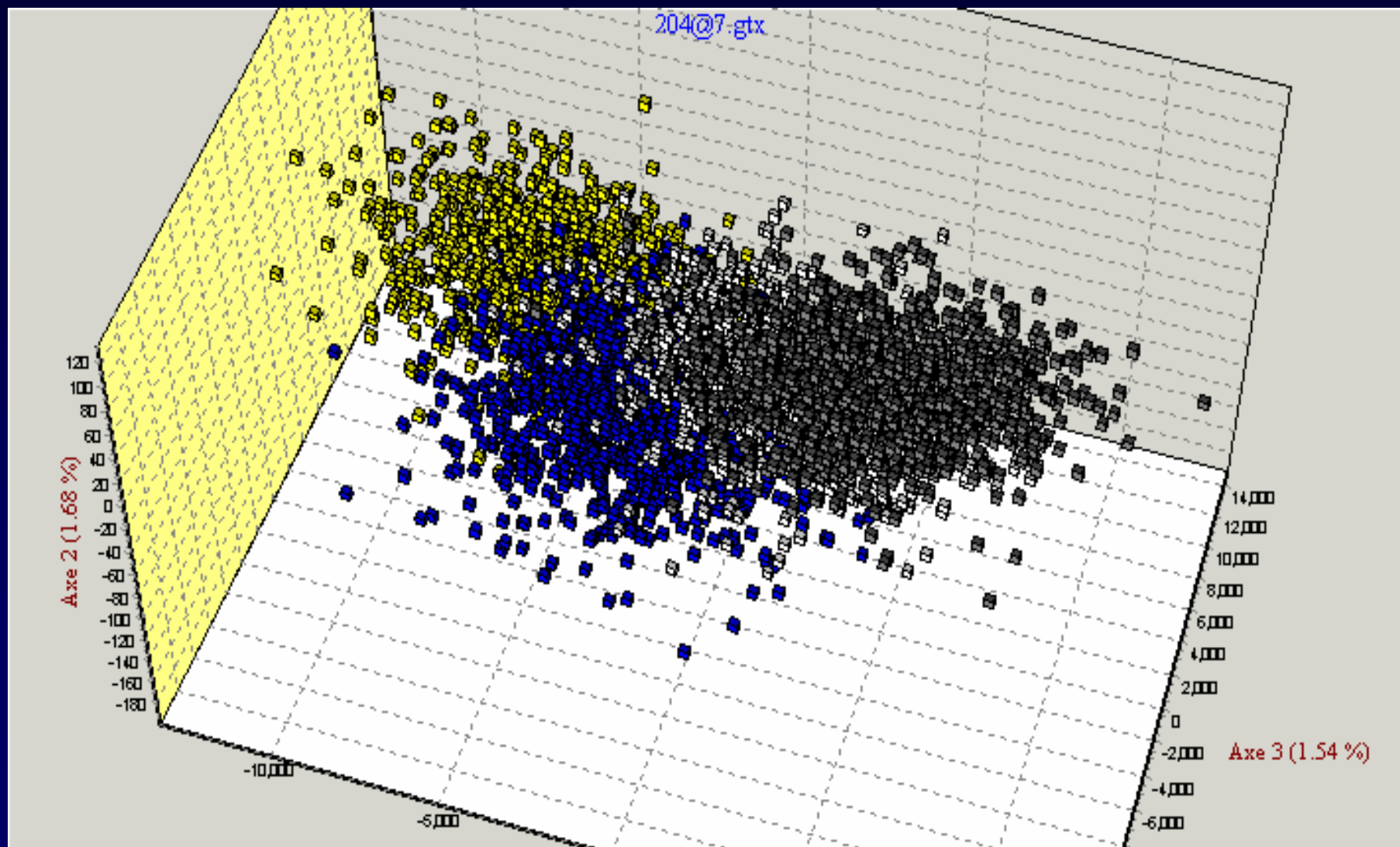
Management needs?

As researchers we strive to  
provide the highest statistical  
power that is possible.

# WHICH Genetic LOCI Have Greater Population Assignment Power?

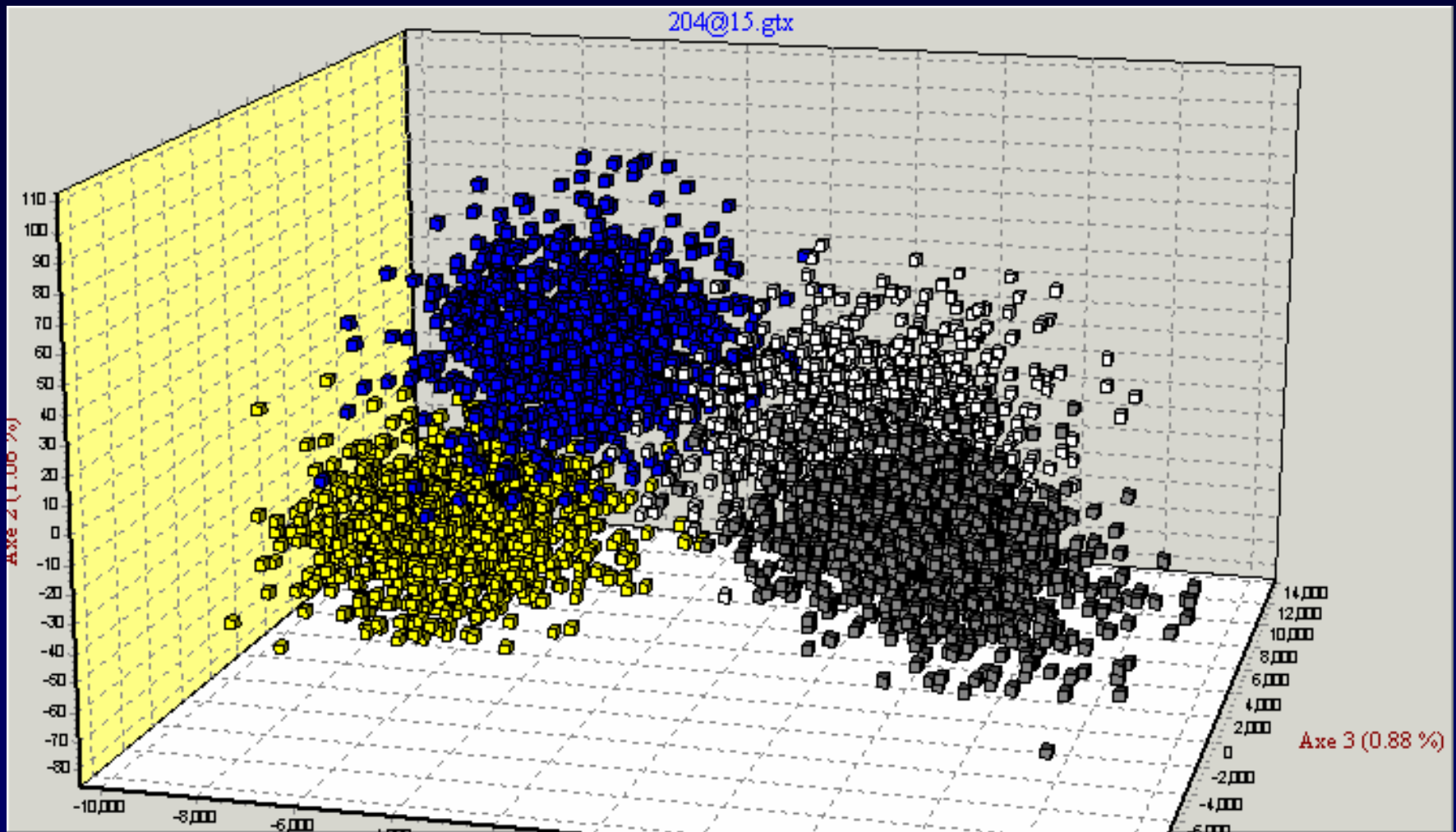
(Banks et al., *Bioinformatics*, 2003)

# Factorial Correspondence Analysis with the 7 Most Diagnostic loci from Banks et al (2000)



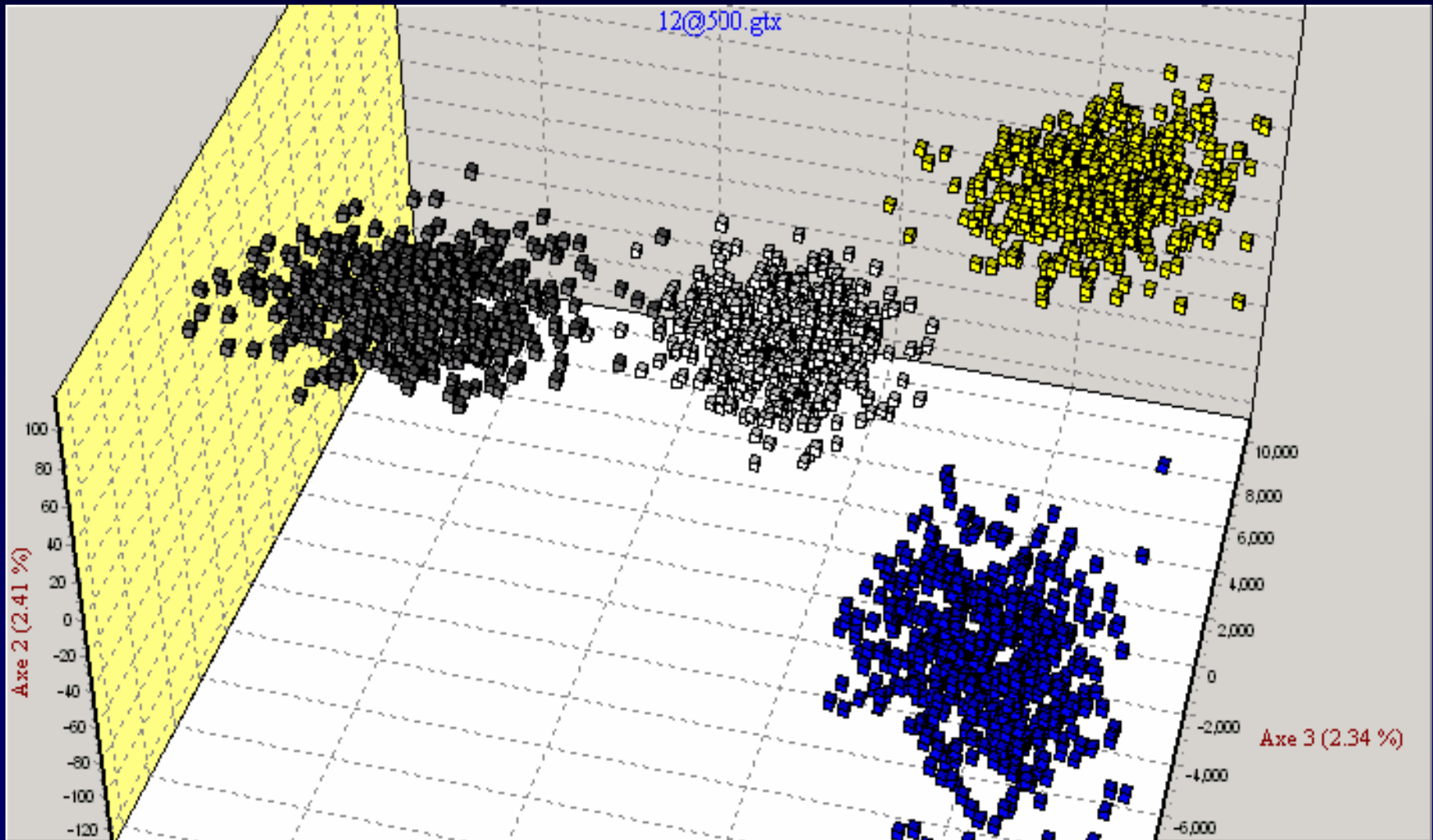


# Factorial Correspondence Analysis with the Top 15 loci for Spring Run ID



# Top 12

*Ots-311, 107, 409, 422, 209, 253, 204, 104, 249, 211, 83b, 213*



# Marker Choices

Neutral – Selection

Microsatellites – MHC & other SNPs

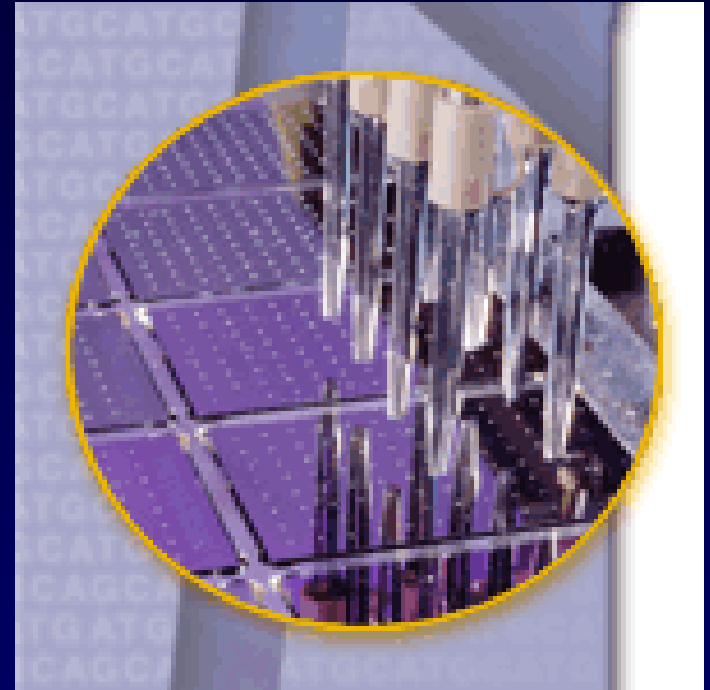
495 alleles (GAPS) – 40 SNPs (80 alleles)

NOTE: If GSI is the primary goal, choices left or right are immaterial – sole concern is to establish what minimum # of specific loci will get you the greatest power

# Genotyping Technology



Gel based electrophoresis  
Base Station (MJ Research)



Time of flight MassSpec  
MassARRAY System  
MALDI-TOF



# MALDI-TOF Mass Spectrometry



SEQUENCING



# What does this cost?

\$1.00/genotype OR LESS!

Note however:

Has not yet been optimized for microsatellites

But has impressive SNP discovery assays

and exceptionally high through-put:

4000 VS 400 genotypes in 2 hrs

# Costs of MALDI-TOF cont.

105 populations, 149 sample/pop = 15,120

40 SNPs thus  $40 * 15,120 = 604,800$  genotypes

As:            1 plex            : \$604,800

                 2 plex            : \$302,400

                 5 plex            : \$120,960

                 10 plex           : \$ 60,480!

# Conclusions

Loci choice results in worthy power increase and cost saving gains (both for individual & population based GSI methods).

Optimum choices are context, criteria and population dependent.

SNPs, including MHC and other candidate loci seem worth investigation because of substantial cost and through-put advantages using new technologies.