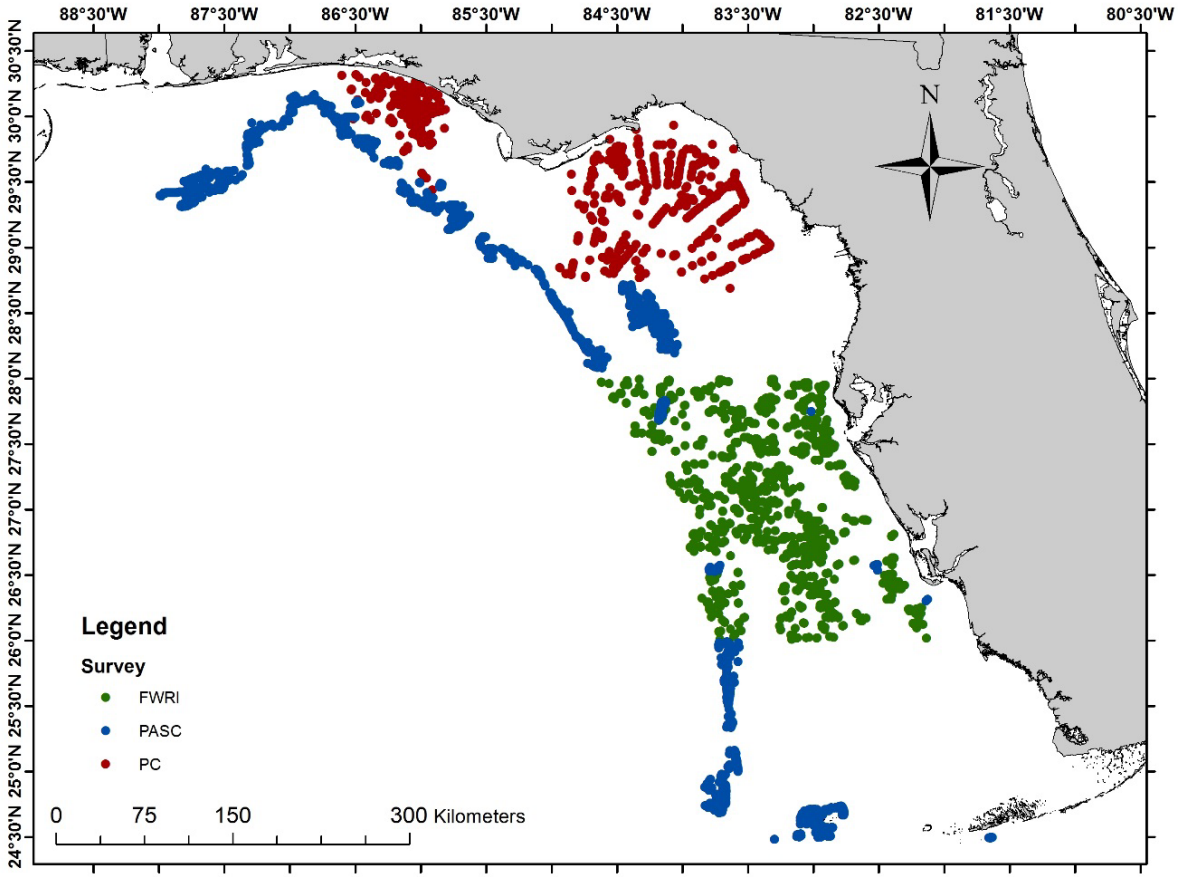
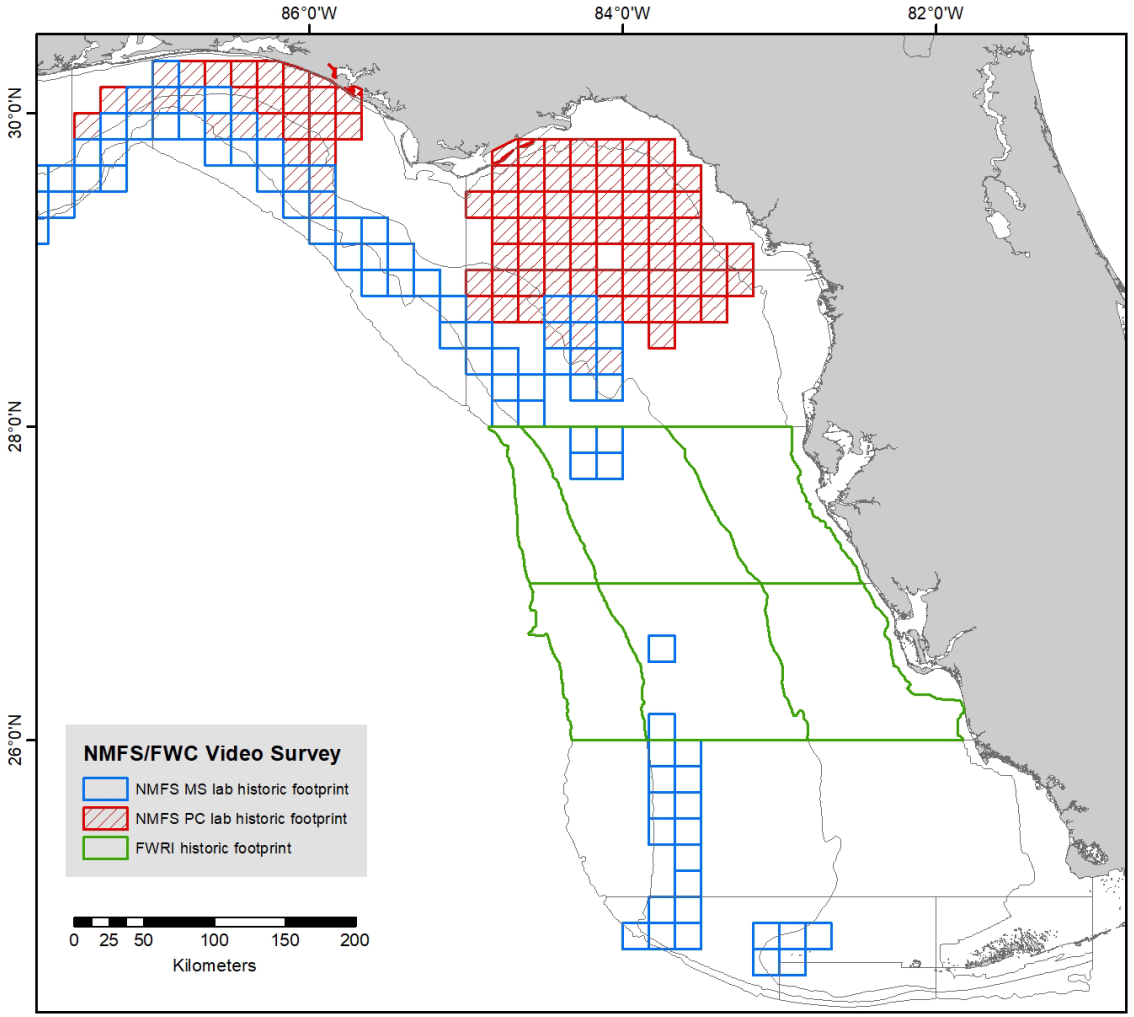
# G-FISHER: Updated Vermilion Snapper Index

- SEDAR 67 – combined video index developed
- Used data from historical survey footprints:
  - **Pascagoula** – 1993 onward
  - **Panama City** – 2006 onward
  - **FWRI** – 2010 onward
- Surveys conducted independently through 2019
- Beginning in 2020, survey efforts combined under G-FISHER



# G-FISHER: Pseudolab

- Problem – How to maintain historical spatial coverage of three surveys for interim analyses?
  - Mississippi NMFS lab (blue) – shelf edge or known higher relief reef areas (e.g., Elbow, FMG)
  - Panama City NMFS lab (red) – mid-shelf areas in Big Bend/Panhandle
  - Florida FWRI lab (green) – mid & outer shelf on central West Florida shelf
- Solution – assign each site sampled by G-FISHER to Pseudolab based on which historical universe footprint it falls within



# G-FISHER: Pseudolab – 2020 and 2021 sampling sites

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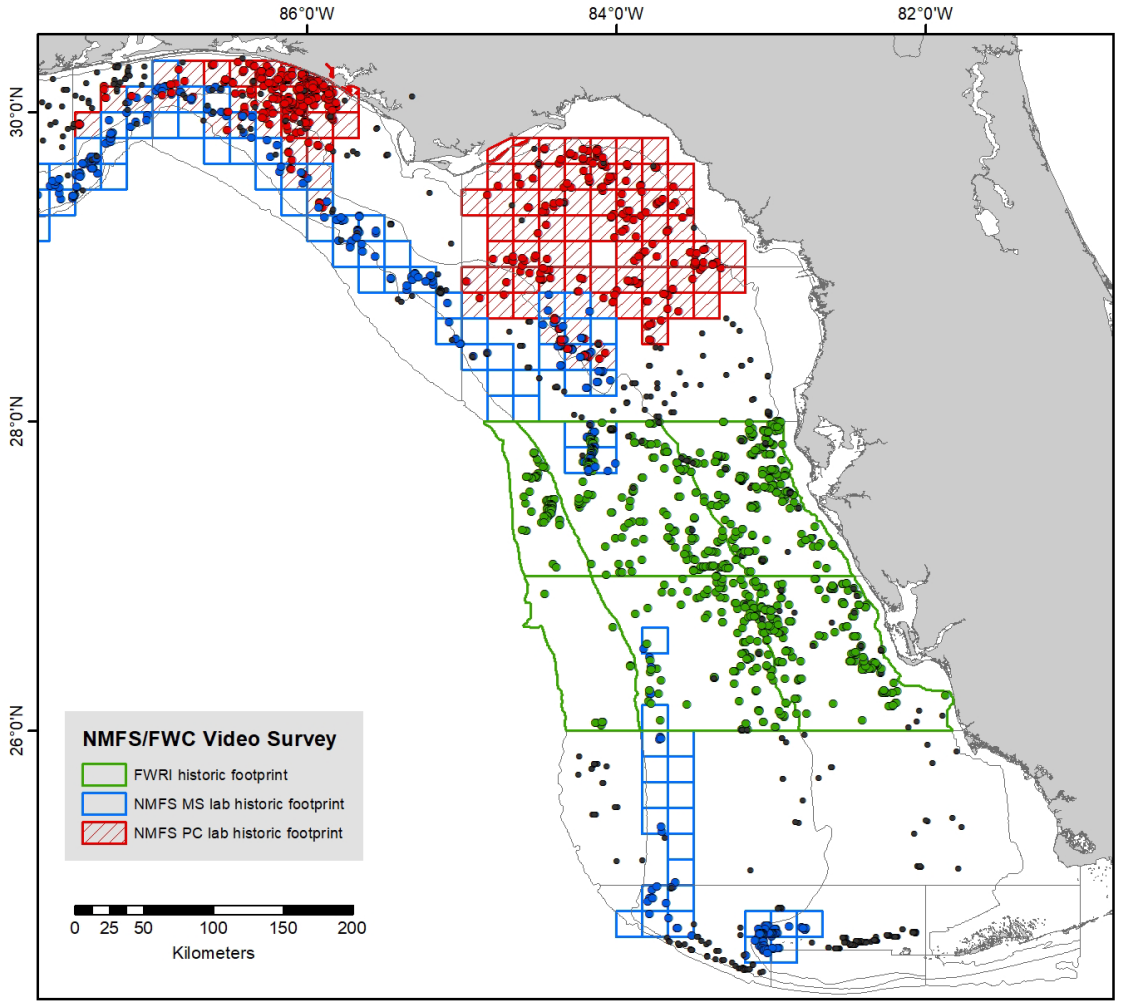
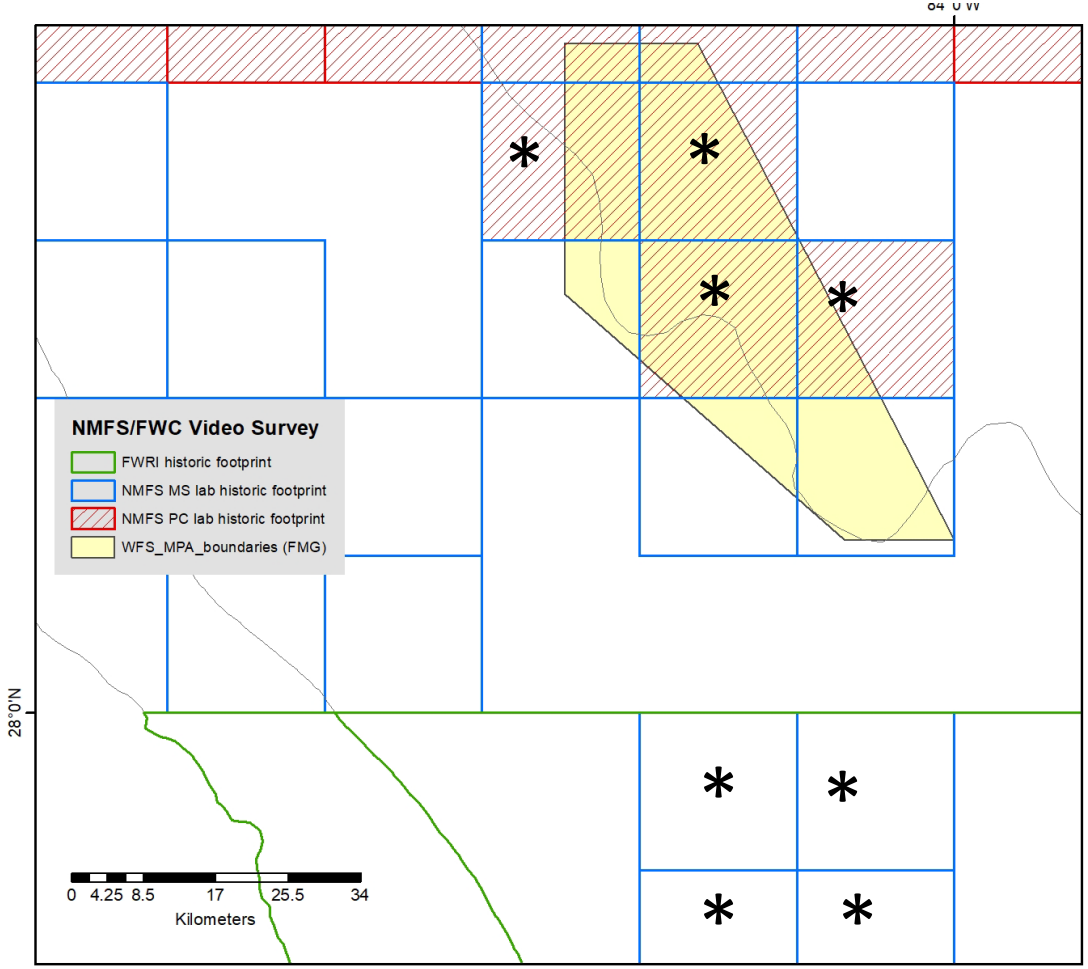


# G-FISHER: Pseudolab overlapping areas

- Some blocks occur within multiple historical survey footprints (asterisks)
- To maintain historical survey coverage, sites within overlapping areas were randomly allocated between surveys equally (same approach applied to Gag data)
- Once Pseudolab assigned, analyses conducted following standard combined index methods



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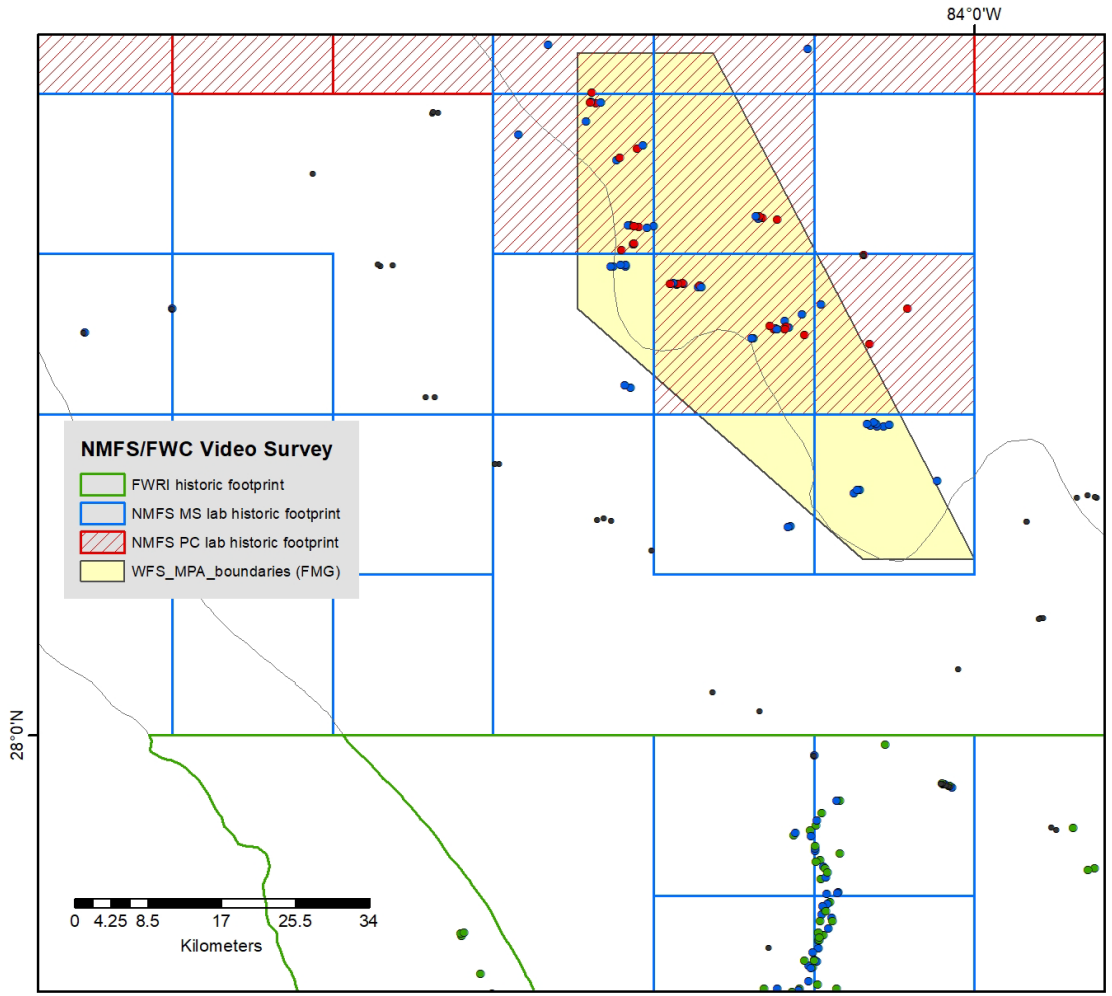
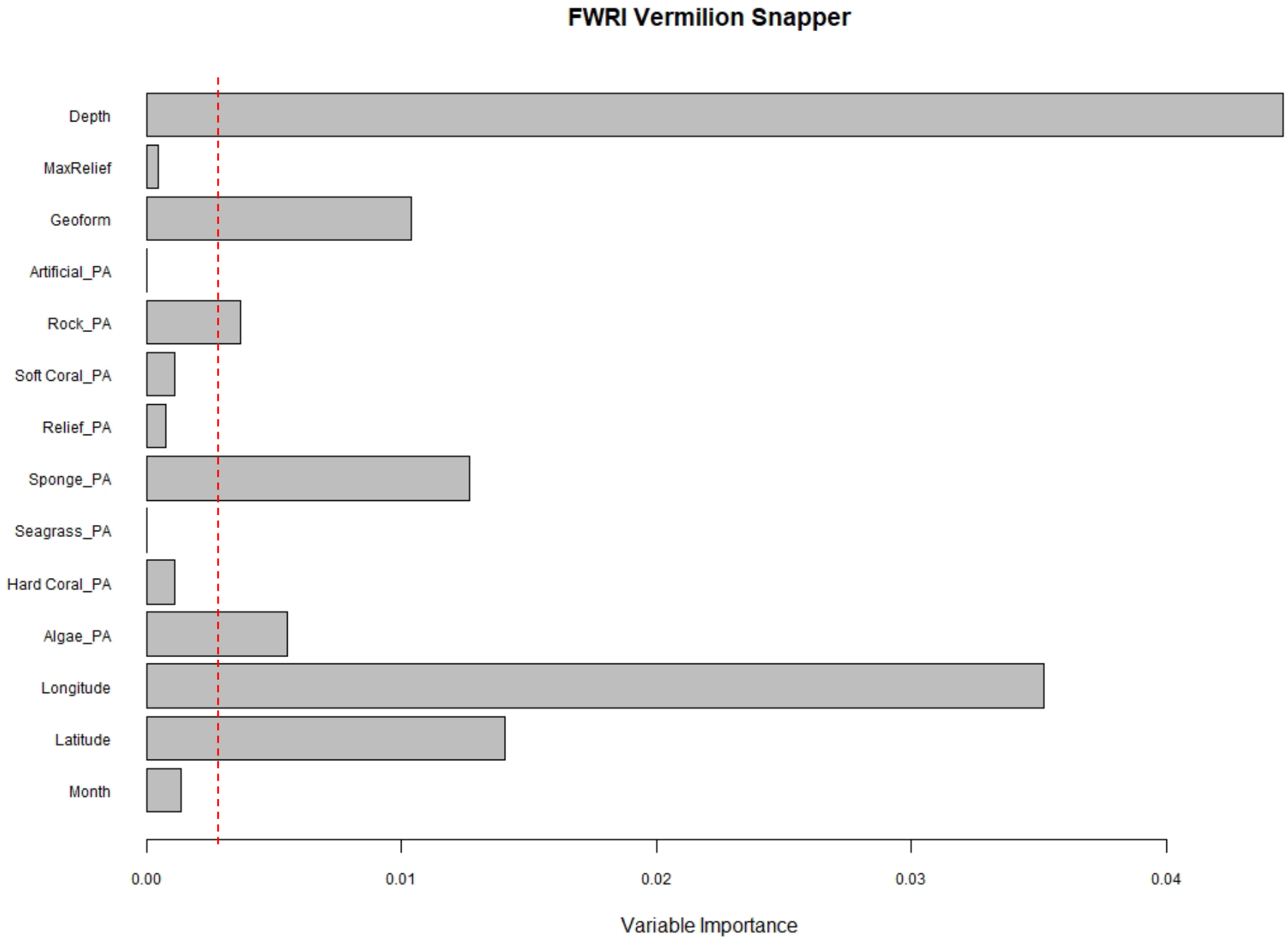
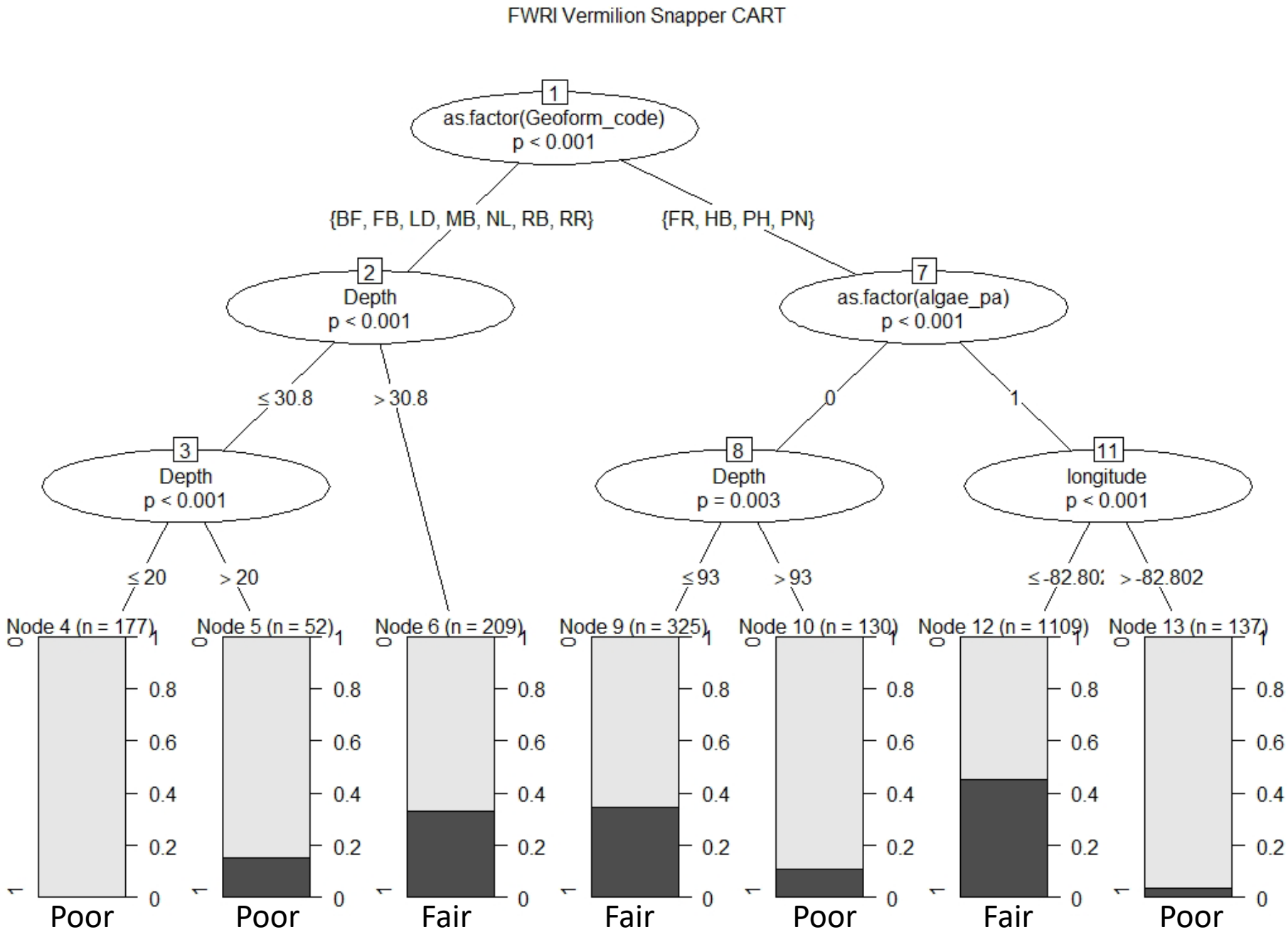
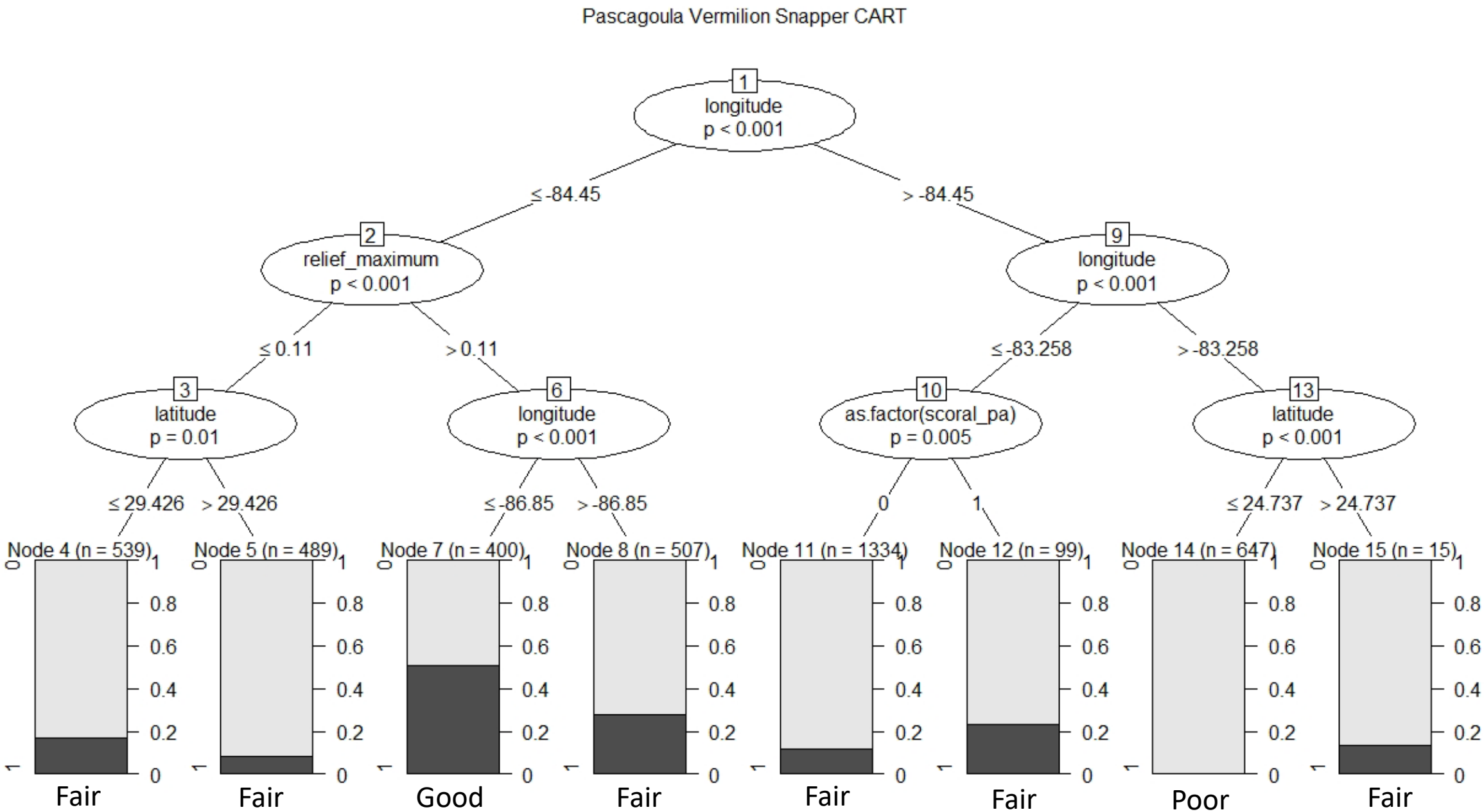


# Sample Size

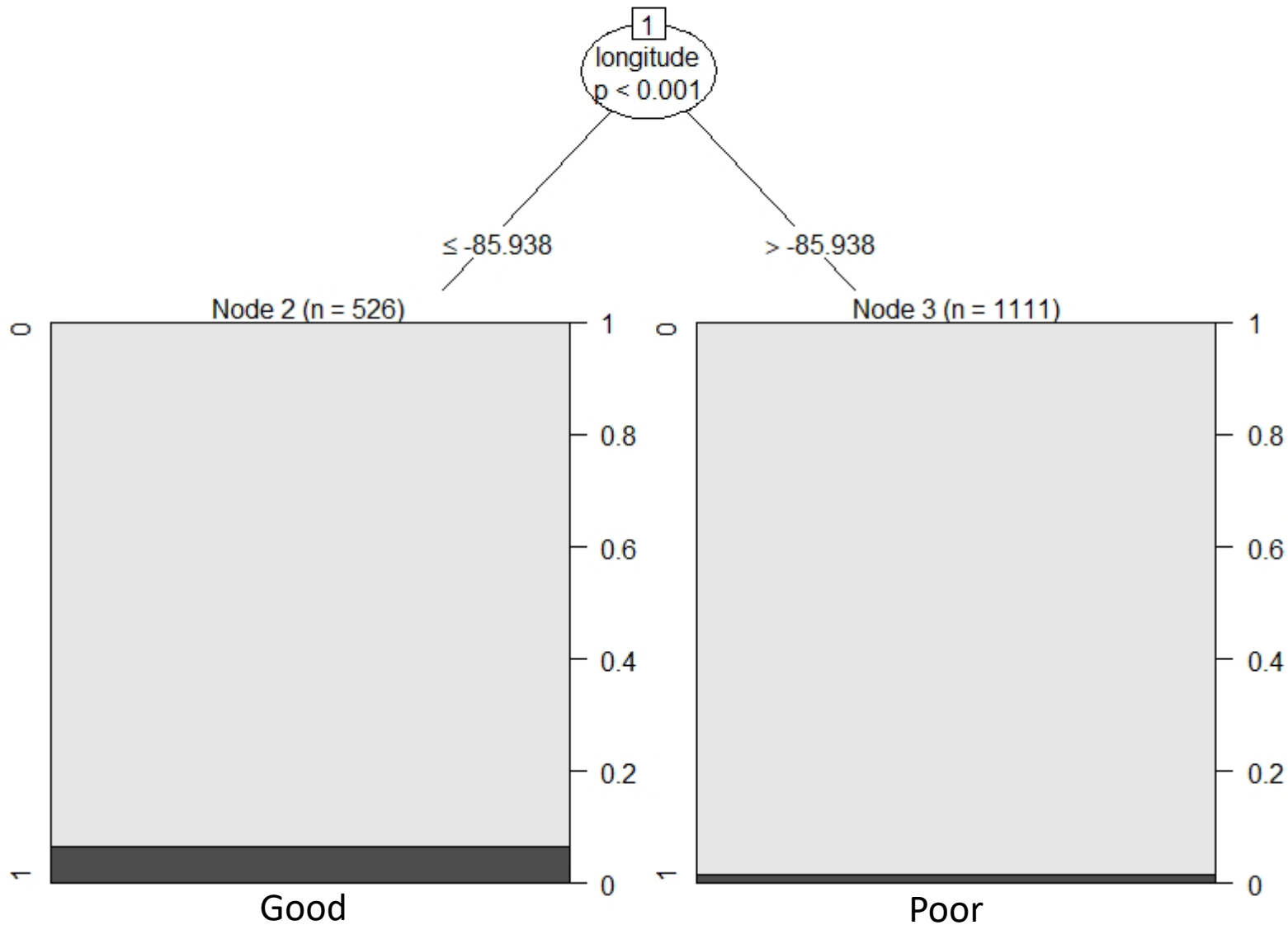
| | FWRI | PC | Pasc | Total |
|---|---|---|---|---|
| 1993 | 0 | 0 | 123 | 123 |
| 1994 | 0 | 0 | 99 | 99 |
| 1995 | 0 | 0 | 70 | 70 |
| 1996 | 0 | 0 | 153 | 153 |
| 1997 | 0 | 0 | 164 | 164 |
| 2002 | 0 | 0 | 153 | 153 |
| 2004 | 0 | 0 | 150 | 150 |
| 2005 | 0 | 0 | 288 | 288 |
| 2006 | 0 | 92 | 289 | 381 |
| 2007 | 0 | 53 | 330 | 383 |
| 2008 | 0 | 83 | 208 | 291 |
| 2009 | 0 | 106 | 265 | 371 |
| 2010 | 43 | 135 | 223 | 401 |
| 2011 | 205 | 158 | 349 | 712 |
| 2012 | 214 | 150 | 283 | 647 |
| 2013 | 184 | 84 | 167 | 435 |
| 2014 | 276 | 160 | 235 | 671 |
| 2015 | 231 | 166 | 152 | 549 |
| 2016 | 225 | 168 | 206 | 599 |
| 2017 | 175 | 150 | 223 | 548 |
| 2018 | 179 | 92 | 213 | 484 |
| 2019 | 230 | 107 | 292 | 629 |
| 2020 | 342 | 137 | 133 | 612 |
| 2021 | 374 | 263 | 173 | 810 |
| Total | 2678 | 2104 | 4941 | 9723 |


FWRI Vermilion Snapper
Depth
MaxRelief
Geoform
Artificial_PA
Rock_PA
Soft Coral_PA
Relief_PA
Sponge_PA
Seagrass_PA
Hard Coral_PA
Algae_PA
Longitude
Latitude
Month
0.00
0.01
0.02
0.03
0.04
Variable Importance


FWRI Vermilion Snapper CART
1
as.factor(Geoform_code)
p < 0.001
{BF, FB, LD, MB, NL, RB, RR}
{FR, HB, PH, PN}
2
Depth
p < 0.001
7
as.factor(algae_pa)
p < 0.001
≤ 30.8
> 30.8
0
1
3
Depth
p < 0.001
8
Depth
p = 0.003
11
longitude
p < 0.001
≤ 20
> 20
≤ 93
> 93
≤ -82.80
> -82.802
Node 4 (n = 177)
Node 5 (n = 52)
Node 6 (n = 209)
Node 9 (n = 325)
Node 10 (n = 130)
Node 12 (n = 1109)
Node 13 (n = 137)
0
1
0.8
0.6
0.4
0.2
Poor
Poor
Fair
Fair
Poor
Fair
Poor


Pascagoula Vermilion Snapper CART
1
longitude
p < 0.001
≤ -84.45
> -84.45
2
relief_maximum
p < 0.001
9
longitude
p < 0.001
≤ 0.11
> 0.11
≤ -83.258
> -83.258
3
latitude
p = 0.01
6
longitude
p < 0.001
10
as.factor(scoral_pa)
p = 0.005
13
latitude
p < 0.001
≤ 29.426
> 29.426
≤ -86.85
> -86.85
0
1
≤ 24.737
> 24.737
Node 4 (n = 539)
Node 5 (n = 489)
Node 7 (n = 400)
Node 8 (n = 507)
Node 11 (n = 1334)
Node 12 (n = 99)
Node 14 (n = 647)
Node 15 (n = 15)
Fair
Fair
Good
Fair
Fair
Fair
Poor
Fair

PC Vermilion Snapper CART



# Area weights

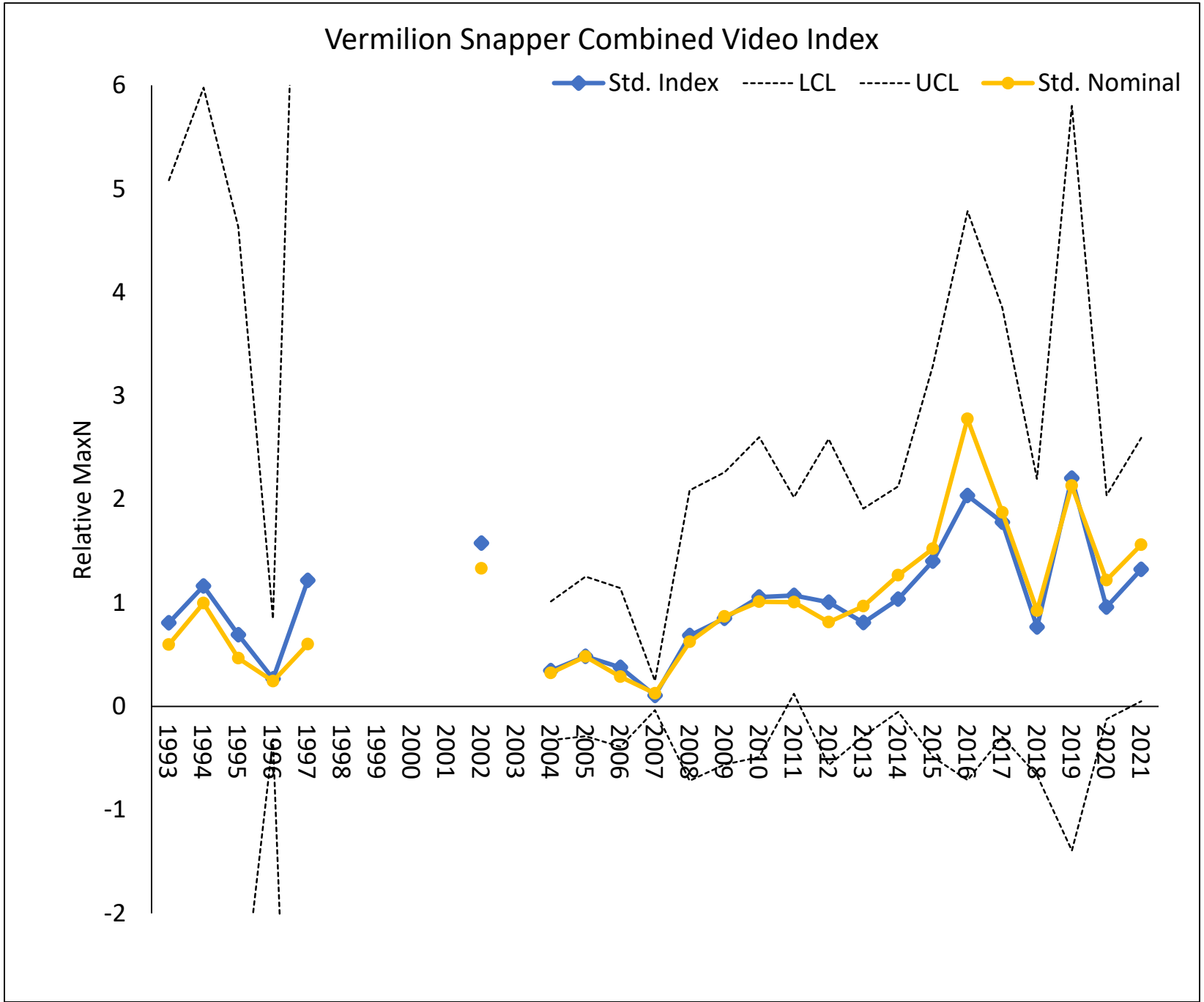
| | Survey | | |
|---|---|---|---|
| | SRFV (1993-2021) | PC (2006-2021) | FWRI (2010-2021) |
| **Total Universe Area ($km^2$)** | 34490.0 | 22104.7 | 37290.0 |
| **Area x Proportion of mapped with reef** | 27936.90 | 14860.90 | 10814.09 |
| **Time Period Weighting Values** | | | |
| **1993-2005** | 1 | | |
| **2006-2009** | 0.65 | 0.35 | |
| **2010-2021** | 0.52 | 0.28 | 0.20 |

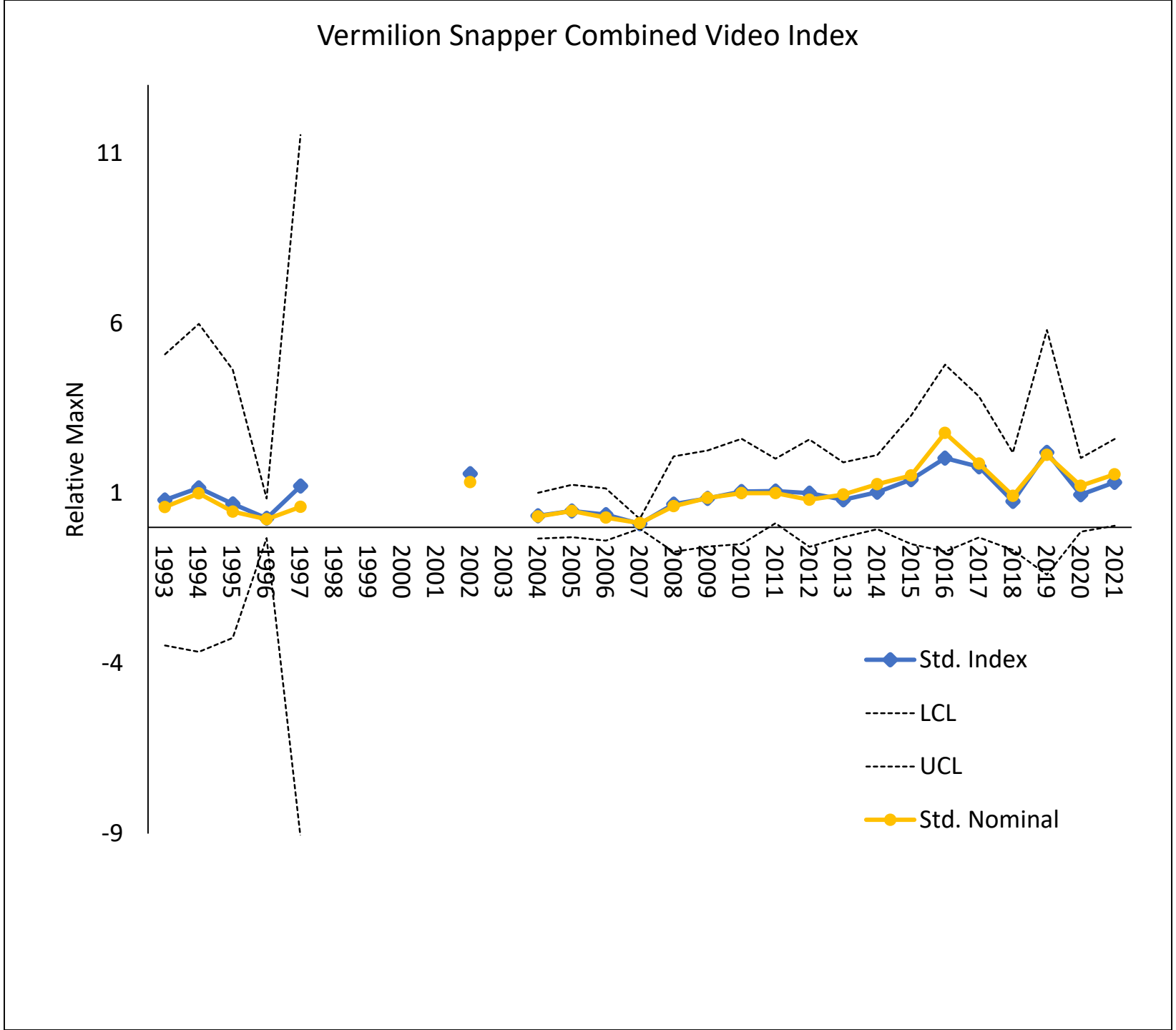
# Habitat proportions

| | SRFV | FWRI | PC |
|---|---|---|---|
| **Good** | 0.10 | | 0.28 |
| **Fair** | 0.75 | 0.85 | |
| **Poor** | 0.15 | 0.15 | 0.72 |

# Index Trends

| Year | N | Prop positive | Std. Index | LCL | UCL | CV | Nominal |
|---|---|---|---|---|---|---|---|
| 1993 | 123 | 0.1301 | 0.8058 | -3.4724 | 5.0840 | 0.8355 | 0.5957 |
| 1994 | 99 | 0.2121 | 1.1614 | -3.6549 | 5.9777 | 0.6526 | 0.9977 |
| 1995 | 70 | 0.1143 | 0.6914 | -3.2497 | 4.6326 | 0.8970 | 0.4647 |
| 1996 | 153 | 0.0980 | 0.2642 | -0.3178 | 0.8462 | 0.3466 | 0.2433 |
| 1997 | 164 | 0.1280 | 1.2158 | -9.0972 | 11.5288 | 1.3348 | 0.6005 |
| 2002 | 153 | 0.1307 | 1.5771 | -3.0946 | 6.2487 | 0.4662 | 1.3313 |
| 2004 | 150 | 0.1067 | 0.3442 | -0.3260 | 1.0144 | 0.3064 | 0.3224 |
| 2005 | 288 | 0.1806 | 0.4828 | -0.2887 | 1.2542 | 0.2515 | 0.4793 |
| 2006 | 381 | 0.0761 | 0.3763 | -0.3894 | 1.1421 | 0.3202 | 0.2846 |
| 2007 | 383 | 0.0679 | 0.1047 | -0.0377 | 0.2471 | 0.2140 | 0.1240 |
| 2008 | 291 | 0.1409 | 0.6841 | -0.7181 | 2.0862 | 0.3226 | 0.6224 |
| 2009 | 371 | 0.1482 | 0.8492 | -0.5623 | 2.2606 | 0.2616 | 0.8674 |
| 2010 | 401 | 0.1122 | 1.0554 | -0.4905 | 2.6013 | 0.2305 | 1.0101 |
| 2011 | 712 | 0.2219 | 1.0705 | 0.1212 | 2.0198 | 0.1395 | 1.0064 |
| 2012 | 647 | 0.1005 | 1.0064 | -0.5698 | 2.5825 | 0.2465 | 0.8131 |
| 2013 | 435 | 0.1885 | 0.8096 | -0.2912 | 1.9104 | 0.2140 | 0.9662 |
| 2014 | 671 | 0.2235 | 1.0360 | -0.0540 | 2.1259 | 0.1656 | 1.2658 |
| 2015 | 549 | 0.2040 | 1.4009 | -0.4892 | 3.2911 | 0.2123 | 1.5225 |
| 2016 | 599 | 0.2487 | 2.0360 | -0.7118 | 4.7837 | 0.2124 | 2.7757 |
| 2017 | 548 | 0.2318 | 1.7779 | -0.2959 | 3.8517 | 0.1836 | 1.8735 |
| 2018 | 484 | 0.1942 | 0.7662 | -0.6648 | 2.1971 | 0.2939 | 0.9240 |
| 2019 | 629 | 0.2417 | 2.2035 | -1.3938 | 5.8007 | 0.2569 | 2.1303 |
| 2020 | 612 | 0.2794 | 0.9584 | -0.1233 | 2.0400 | 0.1776 | 1.2197 |
| 2021 | 810 | 0.1543 | 1.3223 | 0.0492 | 2.5955 | 0.1515 | 1.5595 |


Vermilion Snapper Combined Video Index
Std. Index
LCL
UCL
Std. Nominal
Relative MaxN
6
5
4
3
2
1
0
-1
-2
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021


Vermilion Snapper Combined Video Index
Relative MaxN
11
6
1
-4
-9
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Std. Index
LCL
UCL
Std. Nominal