Models For Estimating the Diver Population of the United States: An Assessment

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The Diver Population

• There are differing arguments over what the U.S. diver population is
• But, it is *critical* to have a reasonable population estimate to generate a realistic diver fatality rate
The Diver Population

• Definition of “population” varies
• Arguments most often cited in scientific and medical literature suggest that the dive industry overstates the population
• This presentation will examine:
  – Flawed assumptions of the common “overstated population” arguments
  – An empirically-derived diver population model with independent empirical support
Common “Population is Overstated” Arguments

Argument 1. There is an 80% drop-out rate in the first 12 months following initial certification

Argument 2. There is significant duplication (“dual certifications”) among diver certifications, which contributes to inflated certification numbers leading to an inflated population estimate

Argument 3. Only “active divers” (subject to various minimum numbers of dives per year) should be counted in the diver population
Argument 1: 80% drop-out in the first 12 months

• Argument lacks empirical basis
• It is contradicted by empirically-based studies:
  – DRI 1987 “Diver Erosion Study”
  – D&R 2006 “Profile of the Most Active Divers in the U.S.: Lifestyle and Demographic Study”
Argument 1: 80% drop-out in the first 12 months

- The 1987 DRI study found that divers “drop-out” rates of:
  - 15% after 12 months from certification
  - 23% after 24 months
  - 33% after 36 months
  - 53% after 48 months
Argument 1: 80% drop-out in the first 12 months

• The 2006 D&R study found:
  – Divers have a 5 year half-life
  – Defined as: “50% of the people certified in any given year will have stopped diving by the end of the fifth year.”
Argument 1: 80% drop-out in the first 12 months

- A recent German study (Tauchsport-Industrieverband (tvi) 2010 “FVSF-Research Report No.31 “Diving in the Future”) supports these findings.
- Found the drop-out rate to be:
  - 10% per annum for divers who do not own gear
  - 8.5% per annum for divers who own gear
Argument 1: 80% drop-out in the first 12 months

• Further to these findings, the 2006 D&R study also found:
  – About 33% of divers surveyed were certified prior to 1995 (10+ years)
  – Divers can be tracked back as far as 20 years
  – Such divers can be considered “vestigial divers”
Argument 1: 80% drop-out in the first 12 months

- Similarly, the 1998 Leisure Trends “Track on Scuba” study found:
  - 14% of the diving population had been diving from 10 to 19 years
Argument 1: 80% drop-out in the first 12 months

Conclusion:

- An 80% year one drop-out rate lacks empirical support and contradicts existing empirical data.
- Empirical data point to a sizeable, long-term diver population.
Argument 2: “Dual certifications” inflate population estimates

- Lacks an empirical basis
- The DEMA Certification Census provides empirical data that contradict this argument
Argument 2: “Dual certifications” inflate population estimates

- The DEMA Certification Census, 2000-2008:
  - Includes entry-level certification data (by individual name and address) from PADI, SDI and SSI (and formerly included NAUI)
  - A TPA de-dupes all names, between and within participants’ certification lists
  - As published by DEMA, finds an initial duplication rate between participants of approx. 1%
Conclusion:
• Duplicate (“Dual”) certifications do not appear to exist in sufficient numbers to significantly inflate diver population estimates
Argument 3: Only “active divers” should be counted

• Defining and counting active divers is a valid concept for *certain* purposes

• It is *not valid* for establishing a population as the basis for a fatality rate
  – If a diving participant can be counted as a fatality for rate purposes, the diver *must* also be counted as part of the population
  – All those who participate in diving within the subject year *must* be counted in establishing a rate
Argument 3: Only “active divers” should be counted

- Diver population estimates actually are typically *under*stated through the exclusion of introductory experience participants.
- Based upon a 2003 Flexo Hiner & Partners study, PADI Members alone provide introductory experiences to an estimated 225,000 U.S. residents per year.
- A fatality rate derived by counting introductory experience fatalities, but excluding the participants from the population, is statistically invalid (over stated).
Argument 3: Only “active divers” should be counted

Conclusion:

- Diver population estimates that count only those divers with some minimum number of dives are not reasonable for use in establishing fatality rates for all divers.
An Appropriate Model

- Empirically-based
- Supported by independent empirical studies
- Historical consistency
The NUADC-McAniff Model

- Diving’s longest term U.S. diver fatality study, 1970-1994
- Diving’s longest-term diver population study, for years 1970-1994
- Published an annual fatality report, added retroactive population and fatality rate in 1980
- Original basis for the frequently quoted diver population estimate of 2.7-3.5 million
- Discontinued after DAN absorbed the program
The NUADC-McAniff Model

The population estimate was based upon:

- Ongoing certification data from the certification organizations
- An early publication, "An Analysis of the Civil Diving Population of the United States"
- Underwater Society of America membership and insurance data
- *Skin Diver Magazine* and telephone diver surveys
- An applied erosion (drop-out) rate
The NUADC-McAniff Model

- In 1995, McAniff applied the DRI erosion curve to his model
- His model’s original estimate fit within the new range
- The population estimate was established at 2.7-3.5 million
The NUADC-McAniff Model

- Independent diver population studies continue to support McAniff’s diver population estimate:
  - National Safety Council 1991 “Accident Facts” – 2.6 million
  - NSGA 1994 “Sports Participation Study” – 2.378 million (excludes Alaska and Hawaii)
  - NSGA 1998 “Sports Participation Study” – 2.558 million
The NUADC-McAniff Model

• Supporting studies (continued):
  – American Sports Data, Inc. 1999 “Super Study of Sports Participation” – 3.2 million
  – Media Mark Research, Inc. 1999 “MRI Sports Trends: Total Scuba Diving Participation” – 2.5 million
  – SGMA 2006 “USA Sports Participation Study” – 2.96 million
  – SGMA 2008 “USA Sports Participation Study” – 3.216 million
The NUADC-McAniff Model

- Status of the NUADC-McAniff Model Since 1995:
  - Discontinued after 1995
  - Ongoing empirical studies continue to support its findings
  - Ongoing diver certification data since 1994 suggest the present diver population remains consistent with the model’s population range
Conclusions

• Arguments that the industry’s dive population estimate (based upon the NUADC-McAniff model) is overstated appear to lack empirical support.
• The NUADC-McAniff model estimates are empirically based and supported by independent, ongoing research.
• It appears that the model’s estimate remains the most suitable figure for scientific and medical studies requiring a U.S. diver population estimate.
• It appears that an effort to update the NUADC-McAniff model would be a worthwhile approach in deriving an accepted diver population estimate – and fatality rate – for the U.S.