

APPENDIX B. *Symbols, Abbreviations, and Acronyms*

1. *Standard symbols, abbreviations, and acronyms*

The following symbols, abbreviations, and acronyms, along with others that are approved for the International System of Units or that appear in *Webster's Third New International Dictionary* or the current edition of *Merriam-Webster's Collegiate Dictionary*, may be used without definition. Note, however, (1) that English units may only be used in two AFS journals—the *North American Journal of Aquaculture* and the *North American Journal of Fisheries Management*—and (2) that additional symbols, abbreviations, and acronyms may be approved for use without definition in specific AFS books (check with the books editor for such terms).

Prefixes

giga (10^9)	G
mega (10^6)	M
kilo (10^3)	k
milli (10^{-3})	m
micro (10^{-6})	μ
nano (10^{-9})	n
pico (10^{-12})	p

Time and Temperature

day	d
hour	h
minute	min
second	s
degrees Celsius ($[\text{°F} - 32]/1.8$)	°C
degrees Fahrenheit ($[1.8 \times \text{°C}] + 32$)	°F

(Spell out year, month, and week.)

Weights and Measures (Metric)

catch per unit effort (define mathematically, e.g., number/net-night)	CPUE
centimeter	cm

meter (1.09 yd, 3.28 ft, 39.4 in)	m
kilometer (0.622 mi)	km
gram (0.0353 oz)	g
kilogram (2.20 lb)	kg
liter (0.264 gal, 1.06 qt)	L
deciliter	dL
hectare (2.47 acres)	ha
nephelometric turbidity units	NTU
practical salinity units	psu
fork length	FL
standard length	SL
total length	TL

(Spell out metric ton [1,000 kg {2,200 lb}].)

Weights and Measures (English)

inch (2.54 cm)	in
foot (30.5 cm)	ft
cubic feet per second (0.0283 m ³ /s)	ft ³ /s
yard (0.914 m, 91.4 cm)	yd
mile (1.61 km)	mi
ounce (28.4 g)	oz
pound (0.454 kg, 454 g)	lb
quart (0.946 L)	qt
gallon (3.79 L)	gal

(Spell out acre [0.405 ha] and ton [2,000 lb or 907 kg])

Mathematics and Statistics

analysis of variance	ANOVA
analysis of covariance	ANCOVA
base of natural logarithms	<i>e</i>
coefficient of variation (define mathematically, e.g., 100 · SD/mean)	CV
common test statistics	<i>F</i> , <i>t</i> , etc.
confidence interval	CI
correlation or regression coefficient	
multiple	<i>R</i>
simple	<i>r</i>
covariance	cov

degree (angular)	°
degrees of freedom	df
expected value	E
logarithm	
natural	\log_e or \ln
base a	\log_a
minute (angular)	'
not significant	NS
percent	%
probability	P
probability of type I error (false rejection of null hypothesis)	P_α or α
probability of type II error (false acceptance of null hypothesis)	β
radian	rad
sample size	N or n
second (angular)	"
standard deviation	SD
standard error	SE
steradian	sr
variance	
population	V or Var
sample	var

Physics and Chemistry

all atomic symbols	H, He, etc.
alternating current	AC
ampere	A
base pairs	bp
becquerel	Bq
calorie (joule preferred)	cal
candela	cd
chemical acronyms in dictionary	DDT, EDTA, etc.
coulomb	C
deoxynucleotide triphosphate	dNTP
dextro configuration	D
dextrorotary	d
direct current	DC
electron volt	eV
equivalent	eq
farad	F
footcandle (0.0929 lx)	fc

gravity	<i>g</i>
gray	Gy
hertz	Hz
horsepower (746 W)	hp
hydrogen ion activity (negative log)	pH
joule	J
levo configuration	L
levorotary	<i>l</i>
lumen	lm
lux	lx
molar	M
mole	mol
newton	N
normal	N
ohm	Ω
ortho	<i>o</i>
para	<i>p</i>
parts per million (in the metric system, use mg/L, mg/kg, etc.)	ppm
parts per thousand	ppt, ‰
pascal	Pa
passive integrated transponder	PIT
polymerase chain reaction	PCR
polyvinyl chloride	PVC
siemens (= mho, Ω^{-1})	S
tesla	T
tris(hydroxymethyl)-aminomethane	tris
volt	V
watt	W
weber	Wb

General

American Type Culture Collection	ATCC
colony-forming units	CFU
compass directions (maps and coordinates)	
east	E
north	N
south	S
west	W
corporate designations	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.

District of Columbia	D.C.
et alii	et al.
et cetera	etc.
filial generation	F
for example	e.g.,
geographical information system(s)	GIS
Global Positioning System	GPS
international units	IU
months in tables and figures	Jan, Feb, Mar, etc.
plaque-forming units	PFU
ploidy	n
sex in tables, figures, and hybrids	
female	♀
male	♂
that is	i.e.,
units	U
United Kingdom	UK
United States	
noun	USA
adjective	U.S.

2. Other symbols, abbreviations, and acronyms

The following symbols, abbreviations, and acronyms are also commonly used in AFS publications. Unlike those in section 1, however, they must be spelled out in full at first use. Alternatives may also be used as long as they are defined.

Ab	antibody
ARMA	autoregressive–moving average
BCWD	bacterial coldwater disease
BHI(A)	brain–heart infusion (agar)
BKD	bacterial kidney disease
BOD	biological (<i>or</i> biochemical) oxygen demand
BP	before present (radiocarbon dating; 1950 = present)
BSA	bovine serum albumin
CCL	certified cell line (ATCC designation)
CCV	Channel Catfish virus

cdf	cumulative density function (<i>cf.</i> pdf)
CHH	Chum Salmon heart (a cell line)
CHSE	Chinook Salmon embryo (a cell line)
CL	(1) certified cell line (variant of CCL); (2) confidence limit
CPE	(1) catch per effort; (2) cytopathic effect
CRL	cell repository line (ATCC designation)
cRNA	complementary RNA
CSE	Coho Salmon embryo (a cell line)
CTM	critical thermal maximum
DBA	dot blot analysis (<i>or</i> assay)
DIDSON	dual-frequency imaging sonar
DO	dissolved oxygen
EIS	environmental impact statement
ELIFA	enzyme-linked immunofiltration assay
ELISA	enzyme-linked immunosorbent assay
EMAP	Environmental Monitoring and Assessment Program (EPA)
EMEM	Eagle's minimum essential medium
ENSO	El Niño–Southern Oscillation
ENV	erythrocytic necrosis virus
EPC	epithelioma papillosum cyprini ¹
ERM	enteric redmouth (disease)
ESU	evolutionarily significant unit
<i>F</i>	instantaneous fishing mortality
F_{MAX}	fishing mortality at which yield per recruit is at a maximum
FAME	fatty acid methyl ester
FHM	Fathead Minnow (a cell line)
GH	growth hormone
GLC	gas–liquid chromatography
GLM	general linear model
GLS	generalized least squares
GnRH	gonadotropin-releasing hormone (synonym of LHRH)
GSI	gonadosomatic index
GtH	gonadotropic hormone
H&E	hematoxylin and eosin (<i>or</i> HE; a group of stains)
Hb	hemoglobin
HBSS	Hanks' balanced salt solution
HCG	human chorionic gonadotropin
Hct	hematocrit
HPI axis	hypothalamic–pituitary–interrenal axis
HPLC	high-performance liquid chromatography

¹ A cell line derived from an epithelial tumor of Common Carp.

HSD	honestly significantly different (<i>or</i> honestly significant difference)
HUFA	highly unsaturated fatty acid
IBI	index of biotic integrity
ICP	inductively coupled argon plasma emission spectrometry
ID	inside diameter
IgA	immunoglobulin A (other immunoglobulins: IgD, IgE, IgG, IgM)
IHNV	infectious hematopoietic necrosis virus
<i>I_n</i>	incipient lethal temperature
INAD	investigational new animal drug (a type of FDA permit)
ip	(<i>or</i> i.p.) intraperitoneal(ly)
IPNV	infectious pancreatic necrosis virus
<i>K</i>	condition factor (usually $10^5 \times \text{weight} / \text{fork length}^3$)
K/A	alkaline/acid
KDM	kidney disease medium
LC50	concentration lethal to 50% of test organisms in a specified time
LD50	dose lethal to 50% of test organisms in a specified time
LH	luteinizing hormone
LHRF	luteinizing hormone releasing factor (synonym for LHRH)
LHRH	luteinizing hormone releasing hormone
LILT	lower incipient lethal temperature
LOEC	lowest-observed-effect concentration
LPS	lipopolysaccharide
LSD	least significant difference
LT50	temperature lethal to 50% of test organisms in a specified time
LWD	large woody debris
<i>M</i>	instantaneous natural mortality
MAB	(<i>or</i> MoAb) monoclonal antibody
MANOVA	multivariate analysis of variance
MATC	maximum acceptable toxicant concentration
<i>m/e</i>	(<i>or</i> <i>m/z</i>) ratio of molecular mass to ionic charge
MEI	morphoedaphic index
MEM	minimum essential medium
meq	milliequivalents (blood Na and K often expressed as meq/L)
MIC	minimum inhibitory concentration
mil	measure of thickness (1 mil = 0.001 in = 0.0254 mm)
MS	mean square
MSE	mean square error
MSH	melanocyte-stimulating hormone
msl	mean sea level
MSY	maximum sustainable yield
NOEC	no-observed-effect concentration

nRNA	nuclear RNA
OD	(1) optical density; (2) outside diameter
OLS	ordinary least squares
OSY	optimum sustainable yield
OTC	oxytetracycline
PAGE	polyacrylamide gel electrophoresis
PAH	polycyclic aromatic hydrocarbon
PAS	periodic acid–Schiff (a stain)
PAUP	phylogenetic analysis using parsimony
PBS	phosphate-buffered saline
PC(A)	principal component (analysis)
Pco ₂	(<i>or pCO₂</i>) partial pressure of CO ₂
PCR	polymerase chain reaction
pdf	probability density function
PGD	proliferative gill disease
PO ₂	(<i>or pO₂</i>) partial pressure of oxygen gas
PONAR	dredge used to sample sediments (<i>not spelled out</i>)
PSD	proportional stock density
PUFA	polyunsaturated fatty acid
Q	discharge or flow of water ²
Q_{10}	factor by which a physiological rate increases per 10°C rise in temperature
RAPD	randomly amplified polymorphic DNA
RBC	(<i>or rbc</i>) red blood cell
RFLP	restriction fragment length polymorphism
RIA	radioimmunoassay
RKM	(<i>or rkm</i>) river kilometer (<i>define point of origin</i>)
RM	river mile
rms	root mean square
RSD	relative stock density
RTH	Rainbow Trout hepatoma (a cell line)
SDA	specific dynamic action (heat loss from digestion [J/{kg × h}])
SDI	shoreline development index
SDS	sodium dodecyl sulfate
SGR	specific growth rate
SH	sulfhydryl
SOPHEIA	solid-phase enzyme immunoassay
sp.	species (singular; plural: spp.)
SPF	specific-pathogen free
S–R	stock–recruitment

² Subscripts denote frequency (e.g., Q_{50} = a 50-year flood, $Q_{2.33}$ = a discharge that occurs every 2.33 years on average.)

SS	sum of squares
SSE	Sockeye Salmon embryo (a cell line)
ssp.	subspecies
SST	sea surface temperature
STE	salt-tris-EDTA
TAC	total allowable catch
TAE	tris-acetate-EDTA (a buffer)
TAN	total ammonia nitrogen
TBE	tris-boric acid (borate)-EDTA (a buffer)
TCID50	tissue culture infective dose producing cytopathic effect in 50% of cultures
TDS	total dissolved solids
TE	tris-EDTA (a buffer)
TED	turtle excluder device
TLC	thin-layer chromatography
TSB	trypticase (<i>or</i> tryptic) soy broth
TYES	trypticase yeast extract agar + skim milk
UILT	upper incipient lethal temperature
UPGMA	unweighted pair-group method with arithmetic averages
VHS(V)	viral hemorrhagic septicemia (virus)
VPA	virtual population analysis
Z	instantaneous total mortality (natural + fishing)